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CONCEPTS OF CONTINUITY.

THE PAPERS AND SYMPOSIA FOR DISCUSSION AT THE
XIVTH JOINT SESSION OF THE ARISTOTELIAN
SOCIETY AND THE MIND ASSOCIATION, AT
UNIVERSITY COLLEGE, READING, JULY 11TH--14TH
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I

FIRST SESSION : *July 11th, 1924, at 8 p.m.*

THE INAUGURAL ADDRESS.

METAPHYSICAL AND RELIGIOUS KNOWLEDGE.

By W. G. DE BURGH.

I.

I HAVE chosen for my opening address a topic of wide range, in the hope that my handling of it, though of necessity somewhat discursive, may provoke discussion, and pave the way for the austerer solemnities that are to follow. Half a century ago, the pretensions of religion to give speculative truth would hardly have roused serious attention in a gathering of philosophers. Today, the case is otherwise : though many, perhaps a majority, still share in the traditional aloofness towards theology and its dogmas. I have no intention of canvassing in detail the merits of orthodox, or indeed of any other, theology ; my sole object is to ask whether the time is not ripe to discard this temper of

indifference, and for philosophers to unite with theologians in an examination of their respective claims to knowledge. That they have moved on divergent paths for more than three centuries is but one symptom of the general disintegration that attended the collapse of the mediæval view of life. The political history of Western Europe furnishes an obvious analogy. We know how the political thought of the Middle Age centred in the belief that all mankind were by nature members of a single community, the *Civitas Dei*; a belief grounded partly on the concept of law of Nature and partly on a broad induction from the actual experience of mediæval society. In the course of the fourteenth and fifteenth centuries, this ideal of the unity of Christendom dissolved before the forces of particularism. In its stead there arose an aggregate of independent nation-states, whose antagonisms, thinly veiled by transitory and partial accommodations, presented, and, as we know from bitter experience, still present, an almost insoluble problem to the statesmen of the western world. Here, at least, the doctrine of external relations has furnished its own *reductio ad absurdum*. We are turning, in our perplexity, a regretful gaze towards the ideal of solidarity that found expression, however imperfectly, in the public life and institutions of the Middle Age. In the domain of knowledge, thanks to the passion for unity that is the life-blood of metaphysics, the *Civitas Dei* suffered less violence. Yet, here also, analysis outran synthesis: metaphysics and science, psychology and ethics, physics and biology—it is needless to multiply examples—pursued their several paths, and the *ententes* periodically established between them proved to be external adjustments rather than effective syntheses. Emphatically has this been the case with metaphysical and religious knowledge. For Protestantism, at all events, the latter came to mean either the abstract intellectualism, known as Deism, for which, in Mark Pattison's phrase, God existed mainly that His being might be proved; or else a faith in revelation,

providence, and miracles, conceived as arbitrary intrusions of the supernatural into the realm of reason and physical law. Between such a theology and a philosophy dominated by the concepts of mathematical physics, there could only exist hostility, tempered by fitful and inconclusive negotiations. The human spirit cannot rest in such a dualism of its highest interests. With the recognition by metaphysics of the interpenetration of the spiritual and the physical, and by theology of what Baron von Hügel has called the "Incarnational" or "sense-and-spirit" character of religious experience, the demand for a closer synthesis is bound to arise. It cannot be met by a sterile reversion to the past. "Back to Aquinas," in any sense other than *reculer pour mieux sauter*, is, both for philosophy and for religion, a counsel, not of perfection, but of despair. As, in the political order, what appeared negatively as disintegration, meant on the positive side freedom of opportunity for the several nations to work out their own salvation for the good of humanity at large; so the dissolution of the mediæval harmony between religion and philosophy secured liberty of development for both alike. Their autonomy is as sacred as that of nations. An agreement purchased by the sacrifice of either is as unthinkable as is the absorption of the individuality of the peoples in a single supernatural state.

II.

The demand for a synthesis implies that religion gives knowledge, and knowledge of a distinctive kind, neither sundered *to toto cælo* from philosophy, nor wholly dependent on it. It falls to the ground, if the theology, in which this knowledge is expressed in propositional form, is interpreted either as a mere working-code or as a mythological fiction, to be superseded for the enlightened

by the truths of metaphysics. These two positions are closely allied, but it will be convenient to discuss them separately. The former was held in an extreme form by Spinoza, in the 14th and 15th chapters of his *Tractatus Theologico-Politicus*, at a time when the impulse towards disintegration was at its climax, and when the relegation of religion to the sphere of the practical seemed an obvious solution of the difficulty. Spinoza maintained that "inter fidem sive Theologiam et Philosophiam nullum esse commercium nullamve affinitatem"; for the former is purely practical, while philosophy, and philosophy alone, gives speculative truth. The value of religion lies solely in works, viz., in obedience to the Divine ordinance prescribing charity and justice as the way of salvation. Theology is reduced to a minimum, to the "Fidei universalis dogmata," which all honest men will accept without demur, i.e. the beliefs in God's existence and in the moral rule which He has revealed. Even within these limits, the doctrines are hardly as non-contentious as Spinoza supposed; nor is the admission of any revealed truth, indemonstrable to the "natural light" and possessed of "moral certitude," easy to reconcile with the general tenor of his philosophy. To many, again, the *scientia intuitiva* of the *Ethics* will seem a more fitting expression of religious experience than the working-code of the *Tractatus*. But the view that religion is morality *plus* the belief in God commended itself widely to modern thought, and is still a live alternative. We may recall Mr. Bradley's theory that religion differs from morality in that for religion the ideal is also real.* No living philosopher has insisted more forcibly than Mr. Bradley on the relativity of the distinction between theory and practice; yet, within its just limits, he holds that religion is "essentially"—i.e. predominantly —practical, and in this respect to be contrasted with philosophy. "The essence of religion is

* See *Appearance*, 150, 438 ff, and *Essays* 441-2.

not knowledge.”* It is difficult to define precisely his position ; for his later writings appear to make large concessions to the claim of religion to give truth. “ The ideas which best express our highest religious needs and their satisfaction must certainly be true ” ; if they lack ultimate truth, it is only that “ in this respect they are like the whole body of special truths attainable by us, or indeed by any other possible finite being.† We hear, too, the echo of Aquinas’s famous dictum : “ impossibile est naturale desiderium esse inane.”‡ But for Aquinas man’s natural desire was that of reason, and its proper satisfaction the apprehension of speculative truth.

Now I contend that religion is, in essence, theoretical as well as practical, and that, even as practical, it cannot be identified with morality. It is possible, not only to be moral without being religious, but to be religious without being moral.§ Where, as in the higher religions, the relationship is most intimate, the moral life is radically transformed when permeated by religion. Moreover, the very practical function of religion requires a knowledge that is more than a working creed. Missionary effort, to prove effective, must rest on a body of doctrine that claims truth. Sin cannot be overcome by mere discipline, but only by vision, by an ascent from *praxis* to *theoria* of the object of devotion.

* *App.* 453 ; cf. *Essays* 10-13, 24, 428. On “ essentially,” *Logic* 11, 715, 724-5. On the relativity of the distinction, *Essays* 103.

† *Essays* 431 ; cf. 433. “ Whatever ideas really are required in practice by the highest religion are true ” ; and, especially *Logic* 11, 724-5, “ It is only, I think, in religion and in whatever, if but for a moment, rises into religion, that our one-sidedness ” (in abstracting the theoretical from the practical, and vice versa) “ disappears.”

‡ *E.g.*, *Essays* 26. “ In and for philosophy, truth is in the end true because I have a certain want and because I act in a certain manner.”

§ Compare Prof. Alexander’s distinction between deity-blindness and moral blindness, *S.T.D.* II, 404-8.

"Fides quaerens intellectum" was the motive that inspired the formative epoch of Christian theology. The practical end—the triumph of the gospel of redemption—could only be secured by the aid of intellectual weapons forged in the Hellenic armoury. But, apart altogether from its practical vocation, religion is essentially theoretical. Cognition is both its presupposition and its outcome. Ideas about God, intimations, however crude, of a superhuman reality, condition the simplest act of worship. Faith, in its turn, because of the dimness of its vision, intensifies the desire for clearer apprehension. Thus every religion implies a world-view, couched at the primitive level in naïve and fragmentary imagery, conceived in the higher religions as a theodicy that appeals to the intelligence. In speaking of the "higher" religions, I have Christianity specially in mind: for I know no other religion "by acquaintance," and it is perilous to rely on knowledge that is merely from the outside. Yet evidence can be found elsewhere that religion is bound to enlist in its service the whole of man's nature, his intellect as well as his heart and will. Buddhism, for example, left its founder's hands as an ethical rule, indifferent to speculative problems; but developed naturally, in the five succeeding centuries, both a metaphysic and a theology.* In the higher religions, again—and the Indian records corroborate those of Christianity—the consummation of the religious life is conceived under the form of *theôria* rather than of *praxis*. When Aquinas treats of the felicity of the saints in Paradise, he is careful to subordinate the moment of joy (*i.e.* of complete satisfaction of the will in possession of the loved object) to that of intuitive apprehension of God's nature by the intelligence. What holds of religious experience *in patria* holds also, in varying measure, of religious experience *in via*. All along

* See Prof. Berriedale Keith, *Buddhist Philosophy in India and Ceylon*, especially pp. 39-46, 94, on the "indeterminates" of early Buddhism.

the line, religious faith has its theoretical coefficient, and the latter is intrinsic to the former. In Professor Alexander's words, "God is apprehended cognitively through the religious emotion by the assurance we call religious faith."^{*} At no point can a religion that is true to its intention tolerate the severance of theoretical and practical values.

III.

Here arises the issue between religion and philosophy. Each is autonomous and must recognize the autonomy of the other. So long as religion is relegated to the sphere of the practical, this independence is not in jeopardy. But the case is otherwise when religion, as *theória*, claims truth. Neither religion nor philosophy can tolerate an *imperium in imperio*. Religion cannot impose a creed upon metaphysics; it can only determine on the adequacy of metaphysical conclusions to satisfy the religious consciousness. Philosophy cannot dictate to religion the content of its beliefs; these must have their ultimate source in religious experience. Here, as elsewhere, the function of the philosopher is to analyse and interpret the given. Yet, again, neither can rest satisfied with any truth short of the whole. We must ask, therefore, what is common and what is distinctive to metaphysical and religious knowledge.

(1) Ideally, in the light of their goal as knowledge, there can be no ultimate divergence. The hypothesis of a double truth, that floated fitfully before the mind of the later Middle Age, is not tenable for an instant.[†] With complete knowledge of the universe, in its entirety and in its detail, all distinctions between

^{*} *S.T.D.* II, 402.

[†] It was put forward by Siger of Brabant and the Christian Averroists at Paris in the thirteenth century.

the forms of knowledge would of necessity disappear. It is arguable that such a vision would transcend the bounds of knowledge, and would carry with it a fusion of all activities of the spirit, in which the difference of theoretical and practical, relative even in actual experience, would be *aufgehoben* in a higher synthesis. It seems to be a paradox of the intellect, that it cannot be satisfied in what satisfies the intellect alone. Whether such a consummation of knowledge be called philosophy or religion is a matter of secondary importance. It implies a more radical transformation in the case of philosophy than in that of religion, which, as we have already seen, is never merely theoretical. In any case, such a metaphysics, such a religion, would mean something very different from the metaphysics and the religion that we know. It is more to the purpose to realize that "such is not our rank or condition," and that human knowledge, alike in religion and in philosophy, is confined to partial truth. I make no apology for assuming here, what I know is not unquestioned, that there are degrees of truth, and that absolute truth is nowhere attainable by finite minds. Hence the ground lies open for different lines of approach, each converging towards a single end. Relative, again, to finite experience is the discrimination, within the field of religious knowledge, between the primary knowledge revealed—or, in other words, given—by way of intuition, and the conceptual constructions of theology, in which the religious experience of the community is made explicit and communicable. The distinction cannot be pressed too far; for theology, in its continuous growth, springs out of, and draws life from, the primary intuitions, while these in turn are modified and enriched as intuitions by the speculative processes which they provoke.* *Pectus facit theologum*; though, as we

* That the connexion of the two is not a logical one has been shown by Prof. Joachim in his inaugural lecture on *Immediate Experience and Mediation*, pp. 9-11. Yet the intuitions of primary religious experience furnish

have noted, the intellect is active from the outset, as well as the heart. Yet, despite this continuity, theology, with its apparatus of stable concepts, is an imperfect embodiment of the *theôria* that gave it birth, and is liable, like all conceptual constructions, to degenerate into sterile formalism. There is here nothing that cannot be paralleled in the history of science and metaphysics; the practical evils that have sprung from formalism in religion have been due to the sovereignty wielded by religious communities over the government of mankind. Of greater significance is the fact that religious experience, when clothed in the garb of theological dogma, becomes amenable to clarification and criticism at the hands of philosophy. But neither form of religious knowledge can substantiate a claim to finality. Religious intuitions differ widely, even when taken on the highest plane, and the differences breed a corresponding diversity in theological creeds. The like is true of metaphysical systems, reflecting varieties of intellectual experience: the divergences between Jew and Christian are not more arresting than those between, let us say, Signor Croce and Mr. Bertrand Russell. If we view the latter with comparative equanimity, it is because they are practically innocuous: while religion, because of the very richness of its content, is inextricably entangled with the conduct of life. Nor does the recognition of the limitations of religious knowledge impede the realization of its value. Aquinas whose affinities with Kant in this and in other respects deserve, I think, more attention than they commonly receive - held that man, in *hoc præsenti statu*, is

the logical antecedents within the process of mediation represented by theology. As such they are modified by the inferential consequents (see pp. 15-16, where the reference to Descartes is specially pertinent, since Descartes's fundamental intuitions, the *Cogito* and the *Deus existit*, are precisely those of religious experience. See Newman, *Apologia*, p. 4, and Westcott, *Gospel of the Resurrection*, pp. 15-16, both cited by Bosanquet, *Value and Destiny*, pp. 253 ff).

precluded from the direct vision of God; the *via remotionis* and the *via analogiae*, both mediate and indirect, alone lie open to his intellect. No Neo-Platonic *ecstasis* is possible under the conditions of earthly life.* His reserve in this matter is the more remarkable when we recall the prevalence of the mystic vision in mediæval Christianity, and the intensity, to which his hymns and devotional writings testify, of his own religious experience. I am well aware that Aquinas, in common with orthodox Catholicism in all ages, asserted the finality of Christian dogmas; subject to the admissions (a) that the *corpus theologicum* is a living growth, still capable of enlargement, (b) that doctrines already defined receive enrichment of meaning with the ever-developing spiritual experience of the Christian society, and (c) that they are always, in Newman's phrase, "economies," i.e. accommodations of perfect truth to the capacities of finite beings in a state of probation. How far finality can be ascribed, under these conditions, to any body of propositions couched in human language is just one of the questions that invite discussion between the theologian and the philosopher. I do not think that such finality is admissible, that either theological dogmas or the primary experience which they define can claim more than relative and partial truth.

(2) If, then, religion gives assurance of truths that transcend the bounds of metaphysical knowledge, this transcendence is incidental to the actual conditions of philosophical thinking in finite minds, and not to any inherent limits in the scope of metaphysics. But this does not prevent the distinction between metaphysical and religious knowledge, under the present conditions of human experience, from being very real. It is analogous,

* Aq., *S. Th.*, I^a, q. 12, art. 4 and 11; *de veritate*, q. 10, art. 11c; see Wicksteed, *Reactions*, Excursus II. On the *via remotionis*, *S.c.G.* I, 14; on the *via analogiae*, *S.c.G.* I, 34, *S. Th.*, I^a, q. 13.

in a certain respect, to the Kantian distinction between the knowledge of speculative science and that of the faith which springs from moral volition. Kant applies the term knowledge, with an extended meaning, to both alike. The practical reason, functioning in moral volition, is reason still, and reveals reality to a rational faith. Rational also is the faith specific to religion. I am anxious to guard against the error of setting reason, in the restricted sense of logical ratiocination, and faith in antithesis one to the other, as characteristics respectively of metaphysical and religious experience. Reason and faith appear in both; though the reason and faith of religion differ specifically from the reason and faith of metaphysics. There is a reason of life as well as a reason of logic, and it finds expression both in moral volition and in the *theoria* of religion. Alike in Plotinus or Spinoza, and in unlettered men and women, there is generated in religious worship a distinctive wisdom, which can only be described as spiritual illumination, a conscious awareness of God analogous to the *visio Dei* anticipated, in the strength of this enlightenment, by Aquinas. Such wisdom is no merely practical foresight, but an intellectual intuition, a form of knowledge that shares the concreteness of its object. To speak of it as "immediate" is misleading, for there are other modes of mediation besides the logical, and, moreover, religious intuition is always, in some measure, logically mediated. The point is rather that the logical mediation never wholly mediates, nor is the truth-value of the intuition proportionate to that of its logical antecedents. Even where, as in Spinoza, the process of logical mediation is dominant, the conclusion remains incommensurable with the premisses. No one, I think, can pass from the first four parts of the *Ethics* to the fifth, without realizing that *scientia intuitiva*, though avowedly the outcome of *ratio*, is parted from it by a gulf that logical mediation fails to bridge. We find ourselves in presence of a specifically religious experience, which is no monopoly of

the philosopher, but is accessible also to a St. Francis or a St. Teresa. In Professor Alexander's words: "Even the intellectual love of God which in Spinoza's system has the force of religion can" make God worshipful, "not as a mere passion for truth in its fullest form, but because it presupposes a religious passion."*

Faith, again, is no idiosyncrasy of the religious consciousness, but a primary condition of all reasonable life. Intellectual research and moral action alike rest on the conviction that the universe is responsive to our speculative and ethical interests. There is justice in the claim, voiced both by mediæval and modern thinkers, that a desire, which is not personal to the individual, but deep rooted in human nature, must find somewhere and somehow its satisfaction. This assumption underlies all religion, all morality, all science. A like faith lies at the basis of social intercourse. Commerce and industry, for example, rest upon credit, the analogue in the economic sphere of that which is "the substance of things hoped for, the evidence of things not seen." Reason is impotent if abstracted from faith and identified with ratiocination. The real distinction is of quality, between the rational faith of metaphysics and that of religion: in that the one is dependent on processes of logical thinking, both for its antecedents and for its issues; while the other is never primarily intellectual in origin, but rather the response of man's whole nature to God's compresence, in a manner analogous, as Professor Alexander has pointed out, to our direct experience of others' selves.† For religion, the personal relationship of the self to God is an *ἀρχή*, which subsequent reflection serves only to interpret

* *S.T.D.*, II, 342. Spinoza's terminology gives an indication of the transformation; whereas hitherto cognitive *ideæ* have been regarded as (logically) prior to emotional, *intellectus* becomes adjectival in the *amor intellectualis Dei*.

† *S.T.D.*, II, 31-37, 380-1.

to the intellect, just as for Kant a metaphysic of ethics analyses and elucidates the given fact of moral experience. And religious faith is knowledge, a knowledge that is personal and "of acquaintance," distinct in form and in content from the inferential knowledge of metaphysics.

The distinction in form of apprehension is correlative with a distinction in the apprehended object. I cannot here discuss the question what dogmas are essential to religious experience, or whether these essential dogmas directly conflict at any point with the conclusions of metaphysics. I am not aware of such contradictions, nor, in the light of the view of truth stated above, can I easily envisage their possibility. These are problems which call urgently for investigation by theologians and philosophers. There would be much to be learnt, for instance, on both sides from a comparison of the metaphysical doctrine of the concrete universal and the Christian doctrines of the Trinity and the Incarnation. But it is clear that the truths of religion carry us, in large measure, beyond the range of demonstrative, or even probable, reasoning.* Religion speaks with clear assurance where metaphysics is sceptical, or tentative, or silent. Moreover, even such philosophical arguments as may be adduced in support are in the eyes of religion of secondary value, as confirmatory evidence of beliefs accepted on other than logical grounds. This is no reason for mistrust of religious knowledge. Religion is, of the two, the wider thing. Strive as it may, and does manfully, to seize reality in its full concreteness, the *Begriff* of metaphysic, *pace* Hegel, can never wholly pierce the veil of the abstract; while religion, as Bosanquet has insisted in his last course of Gifford lectures, "permeates the whole of finite self-conscious life."†

* I am aware that I am using the term "truth" to cover experiences other than reasoned knowledge. But I cannot limit, *e.g.*, the truth of Spinoza's *scientia intuitiva* to that in it which is logically grounded.

† *Value and Destiny*, lect. VIII.

IV.

This view of religious knowledge is obviously at variance with that of the Italian idealists, who hold that religion is a halting-place in the process of the spirit's rhythmic self-development, a moment in its life which is transformed in the richer experience of philosophy. The subject was fully discussed at last year's Conference, and I must content myself with noting how Gentile achieves an arbitrary simplification by restricting religion to the moment of objectivity, wherein the subject renounces selfhood in presence of a transcendent and unknown God. "*L'essere di Dio è il nostro non-essere.*"* This is one essential aspect of religious experience: but there is another, the complementary aspect of personal fruition, which is equally essential, even to the mysticism to which Gentile appeals. Religion is very complex and does not lend itself readily to subsumption under a formula. "He that findeth his life shall lose it"; but also "he that loseth his life for my sake shall find it." I recall how Augustine, essaying to describe the *visio Dei*, found its image in the words "enter thou into the joy of thy Lord"; how St. Bernard pictured Paradise as a scene, not of absorption and self-abasement, but of fruition for the individual in communion with God:—"the shout of them that triumph, the song of them that feast"; and how Aquinas conceived felicity as the satisfaction of man's desire in the attainment of his connatural good. From the very dawn of Christianity, joy has been emphasized as a privileged note of the saintly life. Proof of its presence is, we are told, a prerequisite for canonization;† and the non-Catholic layman is somewhat disconcerted to find that it is a persistent characteristic of the life of the most ascetic among monastic communities. Even Buddhism, which furnishes Gentile with the pure type of religion,

* *Disc. di Rel.*, p. 78.

† Von Hügel, *Essays and Addresses on the Phil. of Religion*, p. 18.

presents Nirvana under the form of enlightenment and liberation.* If I am told that Gentile's discrimination refers to moments in the spirit's dialectic, which cannot be adequately exemplified in historic situations, and that these phenomena are to be interpreted under the rubric, not of religion, but of philosophy, that the saint in his actual experience has transcended the form of religion and realizes the philosophic life; † I must reply, that a philosopher is, of course, at liberty to give words his own meaning, but that a terminology that couples religion with science as collateral expressions of the spirit's death in objectivity, that so intellectualizes religion as to find in it the antithesis of the moral life, and that identifies the life of the Christian saint with the transmutation of religion, by synthesis with art, into metaphysic, ‡ reminds me of Plato's unskilful carver who dismembers the animal without regard to its natural articulation. Rather would I affirm religion to be a specific form of the union of subjectivity and objectivity, and set the religious *a priori* synthesis beside those of morality, art and metaphysics.

Nor can I accept the corollary of this subordination of religion to philosophy, that religious beliefs are of the nature of mythology, to be justified, if at all, as useful accommodations of the truth to the popular intelligence. Logically, this view should take the form of the suggestion, as old as the *Republic*, as new as *Back to Methuselah*, that religious myths should be deliberately fashioned on the pattern of scientific truth. The idea has, of course, never been carried out in practice. Metaphysics has grown out of

* *Disc. di Rel.*, pp. 128, 129.

† *E.g. Discorsi* II, pp. 81-91.

‡ Religion and science conjoined, *Somm.*, vol. I, Pt. III, c. 4, *Teoria gen. d. Spirito* c. XV, § 8; religion as the antithesis of morality, *Disc.* III, e.g. p. 130; philosophy as synthesis of religion and art, *Somm.*, vol. I, Pt. III, c. 4; vol. II, Pt. II, cc. 2 and 4.

mythology, not mythology out of metaphysics. The most that even the Stoics, the great masters of accommodation, could do was to take existing mythologies and force them into the *cadres* of their own system. The real issue turns on the historical factor in all living religions. Is the concreteness thus imparted to religious beliefs to be regarded, in principle, as pictorial imagery, or as truth? Every religious teacher will allow that, in religion or in philosophy, the highest attainable truth is but a fragment of the full reality; and when he says so to the child or the rustic, they can appreciate his meaning. Again, in religion as elsewhere, instruction must be adjusted to the mind and heart of the beginner; but there is a wide gulf between telling children stories of Christ's life without indulging in subtleties on his divine and human personality, and teaching that God is a loving father, when all the time you know that such a relationship is mythical and that the ultimate reality is a universal Ego or a purely immanent Absolute. The term "mythology" has indeed an application within the sphere of religion. There are levels of religious apprehension, and primitive beliefs, in religion as in science, may be described as mythological. But the application is relative to a standard furnished by a fuller religious experience, not by metaphysics, regarded as a tribunal independent of and superior to religion. Nor can we lightly dismiss the historical factor as immaterial to religious value. Thinkers who, like Plotinus of old, and certain Christian theologians of our own time, stress the reality of ideal values to the point of scorning temporal facts, will always evoke a response from minds that revolt from bondage to historic events as from an irrelevant encumbrance to the spiritual life: but it is at the cost of the very religion they desire to save. The world cannot be redeemed by even the noblest of abstractions. This is the incarnational character of religion; its values must be integrated with the facts of temporal history. The facts, to prove effective for religion, must be true; and to publish legend

as truth involves palpable dishonesty. To stamp the historical factor in religious creeds as inherently mythological is, in the long run, to deny value to religious experience.

In conclusion, I would appeal to the fact that religion, being a corporate experience, with a missionary vocation, is, in principle, democratic. It rests on the assumption that truth about God is accessible to all mankind. I cannot therefore believe that a way of life which, like that of metaphysics, is necessarily esoteric, can be the sole line of approach to the highest truth. Were it so, I should be forced to accept Dr. McTaggart's frank conclusion that no one has a right to religion who has not studied metaphysics.* It stands in contrast to Aquinas's famous argument to revelation, that otherwise "that knowledge, which secures man's highest perfection and goodness, would be unattainable save by a few, and by these only after a long period of time."† He added the comment that those who attained this knowledge would be tempted to pride themselves on their intellectual self-sufficiency, pointing thus to the gulf which, for all their manifold contacts, parted and still parts Hellenism from Christianity. *Ἀν-ἄρκεια*, the goal of the Greek philosopher, is, for Christianity, the sin against the Holy Ghost. It is not that ignorance is, for religion, a mark of superiority; but that the knowledge of God is granted as freely to the unlettered as to the learned, to the Apostles or to a St. Francis as to a Butler or an Aquinas. "Do you require," asked Kant at the close of the *Kritik*, "that the knowledge which concerns all men should transcend the common understanding and should be revealed to you only by philosophers?"‡ Or, to close with the words of the teacher, from whom, now nearly forty years ago, I first learnt the value of

* *Some Dogmas of Religion*, pp. 292-3 and foll. pages.

† *S. contra Gent.*, I, cc. 4, 5, cf. *S. Th.* I^a, q. 1, art. 1c.

‡ *Krit. d. reinen Vern.*, Methodenlehre. A. 831, B. 859.

metaphysics : God "if He come at all, comes altogether, sooner perhaps to the day labourer than to the speculative thinker. . . . The modern world can only gain religion, and have such vision of God as man can have, when it realizes to the intensest that the wise and foolish equally enjoy His sunlight, that to Him nothing is common or unclean."*

* William Wallace : *Lectures and Essays*, p. 163.

II

SECOND SESSION : *July 12th, 1924, at 10 a.m.*

Chairman : PROFESSOR A. N. WHITEHEAD.

SYMPOSIUM: THE QUANTUM THEORY: HOW FAR DOES IT MODIFY THE MATHEMATICAL, THE PHYSICAL AND THE PSYCHOLOGICAL CONCEPTS OF CONTINUITY ?

J. W. NICHOLSON, DOROTHY WRINCH, F. A. LINDEMANN,
AND H. WILDON CARR.

I. *By* J. W. NICHOLSON.

WHEN the unrest of the present age—in regard to the fundamental principles of physics—has become so urgent that the whole of physics falls into two mutually exclusive categories, the time arises to take stock of the new matter and to determine in what respects—from any ultimate philosophical aspect of the structure of the universe—old conceptions have been overthrown and new ones have shown themselves capable of replacing them. We mean this, of course, only in a certain sense, for it is doubtful whether any new conceptions, which can go far in an interpretation of experience, remain to be found. They are all present to us, and it is only their validity or scope of usefulness which is in question. From a philosophical standpoint, all that happens is ultimately reducible to the existence of certain entities—only one,

perhaps—which, with the added conception of “change,” can change in certain ways. Perhaps, to an individual thinking mind, there is one fundamental mode of thought. Not without reason, in earlier days, was the interpretation of physical phenomena referred, by those who could not conceive action at a distance, to an all-pervading medium which *propagated* action, which was continuous, and whose mode of working involved no violent change without relation to any duration of time in which the change occurred. All physical phenomena, as they reach the human mind, appear inseparably related to time-duration, even if we have reached a point of view of time which can question, with Prof. Whitehead, whether it is a succession of instants or of durations. We see a cloud in the sky at 12 noon, we describe it as nearer to us at 12.5, and the phenomenon which has occurred cannot be dissociated from a 5-minute interval, in which we have been conscious beings, and can register the appearance of the cloud to our senses at any intervening moment. In the normal mind, even if it made no observation of its own, there exists a time, 12.3, at which some other conscious being made an observation of the cloud, with a conclusion, as to the rate of its approach, which would fit, by a simple mathematical formula, the phenomenon which it observed for itself at 12.5, and from which that phenomenon was deducible by pure logic.

Such matters seem elementary. But the first thing the quantum theory does is to issue an invitation to us to discard them. Let us take the subject of the structure of a hydrogen atom, on the basis of Bohr’s theory of quanta. We picture a mass of positive electricity, so solid as to be incapable of motion which is relevant. Round it circulates a very mobile electron—in one of a sequence of possible orbits, defined after a manner to which we shall refer later. If we may systematize the specification, we may say, with Bohr, that atomic angular momentum must have a set of quite discrete values, the penultimate, or lowest

but one, being actually double that in the ultimate or normal configuration, while nothing *capable* of description as a hydrogen atom can exist between. We must, if the atom is to change from one of these configurations to the other, not attempt to visualize an intermediate stage. The quantum theory does not deny the ultimate possibility of this, but is entirely silent as to its existence, and as to any question of time-duration which can be concerned, and which our mind devines as necessary to any such passage.

At this point, being aware that at a later stage I wish to introduce certain considerations which are of a somewhat more mathematical nature, I propose to approach the subject in a vein of what, to some readers, may seem light comedy, but of what I believe to be very fundamental, in so far as it demonstrates certain relations of the quantum theory to ordinary experience and modes of thought. I will compare the electron in a hydrogen atom to a passenger on the Underground Railway. An electron in a hydrogen atom can take up a "normal" configuration, with a minimum angular momentum, or one with an angular momentum which is any multiple of this value. If it gets, for any reason, any one of these values, it can remain with it, but, in the presence of any disturbing agency, may change to another, which can be any other possible one. We have no criteria for determining which one it will select or is compelled to adopt. Mr. G. K. Chesterton once said, in a protest against the expected, that he would wish that if he entered the Tube at Golders Green the next station were not so definite but might be Sloane Square on some occasion. If he had been an electron, and stations had been "stationary states" of an atom, persisting for a duration and then changing to other states, he would have had his wish, for the train might then equally well have arrived next at any station on the whole Metropolitan system. Such is the chaos of the quantum theory—it is purely a matter of chance what happens

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next, and all possible happenings in an atom are determined solely by a consideration of probability. They can be analysed, of course, by the statistical method, with results appropriate to macroscopic phenomena---as must of course be the case in any theory---and the whole of physics, in so far as it is macroscopic, is in this sense independent of the quantum theory.

It may be that a chaos of this particular type can strike philosophers of certain modes of thought as irrelevant. For it is always possible to take the view, as may physicists do, that the quantum theory as envisaged is ultimately expressible in a mechanistic form which would conform to our more ordinary macroscopic dynamics. In short, we, in our present perceptions of the theory, are very much in the position of Aristotle in his account of the body falling to the earth, and reach paradoxical positions through mere ignorance of the existence of some entities which are vital to a rational statement. When we do not follow the passage of an atom between two states, we are not saying---though some exponents almost say that we are---that no such passage is to be imagined, but merely that we have not an appropriate mechanical language for its description on a logical basis. For the one solid fact in the quantum theory which marks it out from any other is the existence of the universal constant h of Planck. This is not a constant of energy. While it makes us unable to conceive energy as existing ultimately in other than "bundles," the amount in any bundle, even if it is the smallest possible bundle, depends upon its circumstances. For in all systems containing energy, there is a "frequency" which depends on the system and varies from one to another, not, sometimes, even having a commensurable relation between its values in two of them. The energy in a system is $h\nu$ if ν is the "frequency," and perhaps any whole multiple of it, so that the real constant of nature is the quotient of energy and frequency, or product of energy and time. For this mysterious "frequency"

in the quantum theory has some relation to our ordinary conception of the frequency of a wave, and, in fact, is identical with it when the energy is localized in a wave. But when it is not, it can hardly be said to be more than a mathematical symbol, for we have no real conception of any language in which a physical meaning can be given to it, except that it is bound up in some way with a duration of time to which it is inversely proportional, and is in some way analogous to a number of alternations of something per second. Something structural, not necessarily an æther, would seem to be presupposed. An unknown x —perhaps a medium—is capable of alternation in its manifestations. We are then perilously near the definition of the æther as the nominative of the verb to undulate. I will pass at once to the point which, in my opinion, is the one we really wish to discuss.

Given a universal constant of nature, what is its philosophical significance? For our purposes, the quantum theory has introduced a new constant of nature—an *action*, or product of energy and time—but, in so doing, has it introduced anything of a type which was not present in our minds before? I would contend that the nature of any such new constant, in so far as it is expressible in physical language, is of no real importance. At the same time, some remarks on the new constant are perhaps not entirely out of place. *Action* is not a term of real significance to one who has not studied mathematics profoundly, and become familiar with the fact that there exists a conception of action which, by taking only stationary values, leads to all the ordinary dynamical formulation of physics. To one who has not done this, and has conceptions of mechanical entities of a simpler nature, I would refer back to a date at which the conception of the work done by a force—the product of the force and the distance through which it moved a body—was existent, while the “energy” it produced in the body it moved was defined only vaguely as “kinetic energy.” Now we know that the kinetic energy, or

energy possessed by a body in virtue of its motion, depends on the square of its velocity; that the kinetic energy produced by a force is measured by the work which the force has done; that energy and work are synonymous terms, and are physically interchangeable and of the same type—even that all work or potential energy is ultimately energy of motion, represented in other forms, in our mathematical analysis, solely on account of our ignorance of a real physical description of the processes which are going on. The phenomena of magnetism constitute an example, where much consistent and satisfactory theory can be developed, capable even of predicting new results, on a basis of the two-fluid theory of magnetism—but we now know that all magnetic forces are in fact best described as due to the motions of electrical charges.

Thus, in our interpretation of nature, we can, like those before us, use two quite different concepts, in appearances which are in fact the same. Perhaps we still do so. I have emphasized always the fact that *action* and angular momentum are identical in type, in the same sense as energy and work. May we conclude that the new ultimate constant of nature is an “angular momentum,”—always and not only in the cases in which the quantum theory has required that it should be?

If this be so, we have at least a possibility that the microscopic universe may ultimately be expressed in language which a physicist, with a sense of logic, may accept. For the conception of angular momentum is one which admits this type of possibility. I would like to return now to my previous statement that the nature of the new universal constant is not relevant to our discussion, and that it introduces nothing which has not already been introduced by the existence of *any* universal constant of nature. For simplification, I shall consider only the most obvious case, in the belief that the argument is quite general. Let us presuppose that a universal *length* exists in nature, and let us view this length as one intimately associated with the structure of some “medium”

pervading the universe—which, for convenience, we shall call the æther—or with some entity whose changes constitute the universe. If language appropriate to a material form of medium be allowed—as, in my view, it must be if any logical account is possible on the basis of our modes of thought in any possible approach to a discussion of physical phenomena—it may be admitted that all universal constants of length in the universe are derived ultimately from the pervading length in this structure.

Elsewhere, in fact, some years ago, I showed that the universality of the radius of an electron could be replaced by a universal line-constant in an æther in which the electron was only a structure—after the manner of a knot, but a structure which extended indefinitely, while becoming inappreciable to any measurement within a few “radii.” In fact, the electron, so far from being a rigid kind of entity confined to a definite region of space, became all-pervading, and entirely continuous, in so far as a continuous state of strain, in an æther which itself possessed a structure of some form requiring a line-constant, could be regarded as continuous. To this latter problem we must come, but before doing so, I would lay emphasis on the fact that there is nothing in the nature of a line-constant pervading the universe which is foreign to the nature of any other pervading constant which can involve, in addition to length, time. If our consideration of phenomena, as the manifestation of the behaviour of some “medium” with a structure involving a universal length, lead us to the conclusion, as I think it does, that the ultimate continuity or discontinuity of the universe is solely a question of the ultimate continuity or otherwise of this “medium,” then we must equally come to the conclusion that any other universal constant, involving a more complex consideration of structure—for instance, one consisting of rotational motions, with definite angular moments—is in the same category. The continuity or otherwise of physical phenomena then rests with the continuity

of some "medium" or "substance," by which I understand a more general conception than the æther—just the "something" or " x " whose changes constitute phenomena.

Now a line-structure, in the sense necessary to produce a universal length, may not involve any discontinuity. It does not involve us in the view of a mesh-like medium with gaps or discontinuities, like a three-dimensional analogue of a table-cloth. It might equally well be said that a continuous ocean covered by water-waves had a structure, for there is a length associated with them—their wave length—which, so long as they are present, is a constant of the liquid medium. By analogy, we can contemplate the possibility of any constant as merely an interval, in a continuous "medium," in which some manifestation passes from one maximum value to the next minimum, but in quite a continuous way. I see no mode of removing this possibility and consequently of seeing any possibility that we can ultimately imagine any form of physical discontinuity which is essentially different from mathematical discontinuity. Thus it would seem that one part of our title becomes bereft of meaning in a possible mode of thought on physical phenomena. Mathematical discontinuity is the subject we are then driven to, and it is not part of my province.

II. *By* DOROTHY WRINCH.

THE QUANTUM THEORY IN RELATION TO THE LOGICAL CONCEPT OF CONTINUITY.

THE Quantum Theory, in common with the Theory of Relativity, is of great interest and of vast importance to the student of Scientific Methodology. The relation of logical concepts to scientific theory is a study as yet in its infancy. Yet, it is precisely the nature of this relation which is the critical issue in the Quantum Theory regarded as a part of the fabric of modern science.

Mathematics, or Logic---if we may use this latter term to denote the general theory of the structure of concepts and so to include the first---is essentially concerned with possibilities and not with actualities. When it is introduced into scientific theorizing it provides information as to what may happen, and never any information as to what does happen in fact. Given the relevant mathematical theorems, it is for the Natural Sciences to discuss the actual phenomena of the external world.

Thus, in the Quantum Theory, an important and relevant mathematical theorem states that the angular momentum h associated with an orbit described by a particle moving under a central force varying inversely as the square of the distance of the particle from the centre of force, is given by

$$h^2 = \mu l$$

where l is the semi-latus rectum of the conic traced out by the particle, μ being the force exerted on a particle of unit mass at unit distance from the centre of force. This theorem, here stated for convenience in physical terms, is a theorem of

mathematics. It asserts a specific value for the length of the latus rectum of the path of the particle, given the value of μ the strength of the force and h the angular momentum in the orbit.

It is now for physics to specify which, if any, of these possible orbits actually occur in the external world. And it is at this point that a new assumption already mentioned in this symposium is made by the Quantum Theory. It had generally been supposed that any of these mathematically possible orbits is also physically possible. The Quantum Theory, however, introduces a principle of selection among the mathematically possible orbits and indeed adopts the following assumption :—

“ A physical system is only susceptible of a finite number of distinct states ; it jumps from one of these states to another without passing through a continuous series of intermediate states.”*

This general assumption, if applied to the mathematical theorem we have discussed, will evidently severely delimit the orbits mathematically possible. As a physical principle, it selects from the mathematical possibilities. The original mathematical theorem, since it asserts a mathematical fact, gives a catalogue of the logical possibilities. Viewed from this angle, the parts played by mathematics and physics in this matter are clearly entirely distinct. We recognize that all physical possibilities must necessarily be mathematical possibilities : but it is no part of the mathematician's task, nor does it lie within his power, to offer any criticism of the physical principle. The physicist asserts that h can only take specific values ; the mathematician asserts that if μ is fixed, a certain value of h entails as a consequence a certain value of l .

* Poincaré, *Dernières Pensées*, p. 185, as quoted by Jeans in his *Report on Radiation and the Quantum Theory* (1924), p. 25.

Although it is beyond the scope of mathematics to criticize the assumption, it is interesting to notice the general nature of the assumption. The mathematically possible states form a continuous set ; the physically possible states—according to the assumption—form a discontinuous set. The compact series of states previously assumed to be physically possible now gives place—as has already been explained in the first contribution to this symposium—to a discrete series ; in the terminology of modern logic,* an η series is now superseded by an Ω series. The simplest example of a well-ordered series, an Ω series, is the series of natural numbers, 1, 2, 3 n ; the simplest example of a compact series, an η series is the series of fractions in order of magnitude,

$$\dots \frac{1}{4}, \dots \frac{1}{2}, \dots \frac{3}{4}, \dots$$

The nature of well-ordered and compact relations is well understood and the relation between them has been fully investigated. Though logically distinct in some of their properties, they are both asymmetrical, transitive and connected, being both of them serial relations ; further, a compact relation may without difficulty be manufactured formally from a well-ordered relation, for example by the process of exponentiation.† The difference of logical structure between the two can be analysed into terms of various abstract properties.

Any objection to the assumption of a discrete series of states for a physical system instead of the traditional assumption of a continuous series of states is indeed capable of being put in terms of abstract properties of the relation between different states of a single physical system. And indeed, any objection, if it is to be appraised at its true value, should be so expressed. For this reason, if for no other, it has been worth while to refer

* Vide Whitehead and Russell, *Principia Mathematica*, and also Russell, *Introduction to Mathematical Logic*.

† *Proc. Camb. Phil. Soc.* 19, 5 (1919), 219-233.

to the general characteristics of compact and well-ordered serial relations. And, as so often occurs, in the process of being stated in their most fundamental terms, the cogency of the objections disappears. Physical intuitions as to whether very complicated and obscure relations are discrete or compact are clearly, if I may venture to say so, out of place. We have to assume to be true, whatever fits the facts of experience most adequately. If our assumption is discordant with our feelings in the matter, that is of no importance. Only if it is in disagreement with the facts of physics which have been sifted through masses of observational and experimental results of the most delicate and fundamental types, is any modification required. The discontinuities of the Quantum Theory are like the paradoxes of the Theory of Relativity. The suggestion that mass varies with velocity is introduced, for example, in order to relate together, as neatly as possible, certain groups of physical facts which have been gleaned from an enormous number of experiments and observations. It is not introduced to fit in with our private unofficial view of the universe, and, in fact, it would be a dismal failure if it had been introduced with this object. Its value as a hypothesis is to be estimated in terms of its power of relating *inter se* certain well-established physical facts, and it must be judged from this point of view. The situation is precisely the same with regard to the discontinuities of the Quantum Theory. Their justification rests on their usefulness in knitting together the facts of physics. WJW

We have taken the view that mathematics and logic can have no criticisms to make of the assumption of a discrete series of states of certain physical systems in the Quantum Theory. Nevertheless, from the point of view of scientific method the present state of the Theory, with its brilliant welter of *ad hoc* hypotheses, can only be tolerated as an intermediate stage. It is evident that the concepts involved in physics cannot yet be

adequately specified, for, with a complete specification, the selection of an Ω of states from the η series of states mathematically possible would appear deductively and would not be introduced as a principle *ad hoc*. A restatement of the whole theory is urgently called for from the point of view of scientific methodology.

From this point of view any case where an η of possibilities is turned into an Ω of possibilities is of interest. A simple case occurs in the classical theory of the vibration of strings due to Fourier and finally elaborated by the late Lord Rayleigh. If a string of elasticity k and density ρ vibrates m times a second, the wave-length λ of the vibration is $\frac{1}{m} \sqrt{\frac{k}{\rho}}$. Just as we had the relation

$$h^2 = \mu l$$

for the orbital motions described above, so we have the relation

$$\lambda^2 m^2 = k/\rho$$

for the vibrations of a string. Now suppose that the conditions of support of the string are given. It may, for instance, be stretched between two points at a distance l apart. Then we easily deduce that m can take only a certain set of values, we have in fact

$$2 m \lambda \sqrt{\frac{\rho}{k}} = 1, 2, \dots, n, \dots$$

Thus the continuous set of values of m carrying with them corresponding values of λ the wave-lengths are now replaced by a discrete set of values. Once again an η series is replaced by an Ω series.

The way in which the transition has been accomplished is an every-day occurrence in mathematics. For consider a continuous function f associated with a continuous variable x . Take, for example, the function $\sin x$. The values of this function form a continuous set. But, if we consider the values of x for which this function has a specific value—for example, we might

consider the values of x for which $\sin x$ is zero—we have to deal with a discrete set of values. The zeros of an elementary function in fact form a simple and interesting exemplar of the way in which a continuous set of terms can give rise to a discrete series of terms, in a purely formal manner.

Although, therefore, at the present time, it is necessary in expositions of the Quantum Theory to introduce an *ad hoc* assumption (and indeed to introduce such assumptions by no means infrequently) yet ultimately some fundamental assumption will have to be introduced into the bedrock of physical laws which, translated into mathematical form, will yield naturally and inevitably a consequence of the type expressed in these assumptions. This can only come about satisfactorily by means of some general mathematical mechanism. It is for this reason that it has been deemed worth while to introduce the example of the periods of vibration of a stretched string, for in this case the continuous set of values of an elementary function has in the simplest possible way yielded the discrete set of its zeros.

The form of the fundamental postulate which lies behind is not yet known. The atomicity of h the angular momentum may perhaps be derivable from a general structural postulate. There is still the outstanding question of the atomicity of e , the charge carried by an electron. It has already been suggested, on more than one occasion,* that these two atomicities may be special aspects of some principle more general than either of them, but the efforts which have so far been made have not been successful.†

Our conclusions may be briefly stated. The discontinuities of the Quantum Theory in themselves cannot be adversely criticized or even discussed by the mathematician. From the

* See, for example, Jeans, *loc. cit.*, pp. 78–79.

† See, for example, Eddington, *Proc. Roy. Soc., A.*, 1921.

continuous set of states considered possible by the classical mechanics, a discrete set has been selected as alone being physically possible. Any criticism of this assumption can only come from a consideration of how far such an assumption is valuable in relating *inter se* facts of the physical universe which have been adequately established by observation and experiment. Any criticisms on the grounds of our intuitive feelings about continuity are out of place and become quite clearly improper and indeed lacking in cogency when they are stated in terms of the logical concept of continuity. Nevertheless, in so far as the assumptions of the Quantum Theory are introduced *ad hoc* and are not part of the fundamental structure of science, they cannot be considered finally satisfactory. The assumptions of the Theory of Relativity, stated in the analytically convincing invariant form, alone in science at the present day have the touch of finality about them. They alone in their grandeur lie too deep for criticism. Our intuitive ideas of the physical universe are there left behind, and in their abstract beauty, they may not be approached with the rough and ready weapons of every-day life. The Quantum Theory in the tremendous success which it has experienced is pointing the way to a further postulate of the same fundamental character, to another postulate of the same unapproachable severity.

III. *By F. A. LINDEMANN.*

THE idea of quanta was first introduced by Planck nearly twenty years ago in order to account for the distribution of energy in the spectrum of complete radiation. Its triumphs in predicting or explaining successively the velocity of electrons emitted by metals under the influence of light, the atomic heat of solids at low temperatures, the chemical constants of the simpler substances, the spectral series of the lighter elements, the X-ray spectra of all the elements and the various atomic constants have assured it a permanent place in physical thought, and there can be little doubt that it forms the outstanding discovery of our generation.

The principle of relativity modified our outlook because it forced us to realize how arbitrary were our thought-co-ordinates and how much our laws depend upon their arbitrary choice. But though the principle of relativity is able to account for the deviations between the phenomena actually observed and those predicted according to the older views, this difference amounts to but one part in a hundred million. Further, it is clear that the older theories by suitable subsidiary hypotheses would be able to explain these small discrepancies, and it is probably generally admitted by now that the principal merit of relativity is its simplicity and elegance. To discuss whether phenomena really occur in a Euclidean or a non-Euclidean space-time manifold is about as useful as to discuss whether the configuration of the earth's surface is best represented by Mercator or by some other cartographer.

The questions raised by the Quantum Theory are of a somewhat more fundamental kind, and though it is clearly impossible that they should be discussed by the man in the street, it is extremely desirable that they should be considered by competent philosophers. When it is realized that the theory accounts quantitatively for all the numerous phenomena mentioned above, and that the divergence of the quantities observed from those to be expected on the older, so-called classical, theories amounts often to almost 100 per cent., it is remarkable that it has attracted so little general attention outside scientific circles.

The physical rules, which are summed up under the heading Quantum Theory, are fairly definite. But they are little more than rules and their inner meaning is as yet obscure. The essential fact appears to be the exceptional state of periodic systems in which the average values over a complete period of a quantity whose dimensions are $\frac{ML^2}{T}$ (M, L and T representing mass, length and time) are integral multiples of a universal constant usually denoted by the symbol h . Whether h is best regarded as an energy multiplied by a time or a momentum multiplied by a length or the square of a momentum multiplied by a time and divided by a mass or any other of the numerous possibilities has often been discussed. The thesis here put forward is, that it should be treated as a fundamental concept, of which our more usual concepts, *e.g.*, energy or momentum are merely forms of representation. If this view is accepted, there seems nothing more startling in the assumption of units or atoms of action or angular momentum than there is in the idea of indivisible units of mass or electric charge.

In this connexion it is perhaps desirable to examine a little more closely the foundation of our system of fundamental physical concepts and to call attention to an anomaly which has scarcely obtained the notice it appears to deserve. It is a truism to say

that our physical world requires for its description three concepts or dimensions, apart, of course, from the somewhat artificial idea of temperature, which is a measure of the probability of certain distributions and does not apply to individual atomic processes. The concepts or units usually chosen are length, mass and time. Now the psychological anomaly referred to and whose explanation may be of more than academic interest is this, that whereas we are all prepared to believe that the physical universe is built up of discontinuous indivisible units of mass (or electric charge) almost everyone reacts violently against the idea that it might be built up also of indivisible units or atoms of length or time. Discontinuities in mass are a truism : why are discontinuities in length or time treated as revolting and almost indecent ?

The reason perhaps may be that these latter conceptions are purely artificial, invented by ourselves, essentially continuous co-ordinates invaluable in describing events. Just as an attack upon his graven image has been resented more hotly by man throughout the ages than an attack upon his living brother, so we perhaps resent an attack upon the continuity of our artificial length and time co-ordinates more than upon, what may be, the more natural mass co-ordinate. If there is anything in this idea, then it may be that the difficulties of the Quantum Theory are due rather to an anthropomorphic insistence upon the use of certain fundamental concepts than to the nature of the phenomena. The so-called paradoxes of relativity arise only if one insists upon assuming that the four-dimensional space-time interval can be split up uniquely into space and time. May not the repugnance with which we regard the singularities of the Quantum Theory have its origin in the assumption that it is legitimate to describe phenomena in units of mass, length and time ? If we can once attune our minds to the conception that the fundamental quantities are others, if we can state physical laws in these other units and acquire the habit of thinking in

terms thereof, it may well be that the discontinuities of the Quantum Theory will appear as natural as the idea of the indivisible discontinuous electric units, the electrons and protons.

Though the fundamental dimensions or units we use have the advantage of an ancient lineage and a respectable history, there is no disguising the fact that they have proved their value only in describing purely statistical processes in which vast numbers of particles are involved. For mechanics or electrical engineering it is immaterial whether one uses one set of concepts or another. But it is by no means obvious that the same freedom of choice is desirable when we come to consider the interaction of individual atoms. In this case the mental habit of thinking of mechanical processes in terms of length, mass and time may, and as experiment proves does, involve us in disturbing discontinuities, which might well appear quite natural if we thought in terms of (say) mass, charge and action. The first two are everyday concepts, familiar to all physicists, whose atomicity is not only accepted without question, but seems almost inevitable. Is it not possible to attain the same desirable mental attitude towards the third? It is really not a more artificial or arbitrary quantity than (say) force or energy, and its role in the principle of least action has given it a traditional claim upon our regard.

Fifty years elapsed before the idea of energy, a bastard conception if ever there was one, had established itself. Nowadays the term has attained such universal acceptance that probably nobody would object to the idea of quanta of energy. Presumably a similar result would follow if one could familiarize oneself equally with the idea of action, or some similar quantity. May not the solution of the quantum difficulties be found in the choice of a system of fundamental physical concepts which may be thought of as atomic without undue repugnance and whose

atomic structure will lead naturally to the quantum discontinuities ?

It is obvious that we shall choose mass M and electrical charge E as two of our fundamental concepts. Their atomic nature is familiar, and rightly or wrongly they seem easy to visualize. The third concept is less obvious, but in view of the role of Planck's unit of action h in modern physics it seems natural to choose action H . E^2 has the dimensions ML^3T^{-2} if we reduce our new fundamental concept to the old M (mass) L (length) T (time) concepts. Action H has the dimensions ML^2T^{-1} . If we write these identities in the form $E^2 \propto ML^3T^{-2}$ and $H \propto ML^2T^{-1}$ we see at once that $L \propto \frac{H^2}{ME^2}$ and $T \propto \frac{H^3}{ME^3}$.

Thus from our new point of view length and time are derived units so that, *e.g.*, unit length is defined as the length at which unit charge and unit mass rotating would have unit action or moment of angular momentum. Similarly unit force would be the force acting between unit charges and masses rotating with unit action, etc. To say these quantities occur in nature only in discrete multiples of some fundamental natural units need not shock the most sensitive physicist or even philosopher. The statement does not involve any discontinuity in our artificial co-ordinates length and time any more than does, *e.g.*, the fact that the charge and mass of an electron together with the velocity of light define a length. We associate this length with the electron's radius, but we do not say that this involves that lengths have discontinuities. In the same way the fact that m , e and h can yield a length or time merely means that they define the radius and period of electrons rotating on natural orbits, not that length and time are discontinuous.

That the assumption of the discrete ultimate constitution of mass, charge and action yields all the well-known results of the Quantum Theory is indubitable. It would equally yield, as a

special case when one is dealing with large numbers of these ultimate particles, the laws of the classical mechanics and electrodynamics. The conflict, if any, arises, from an attempt to apply laws obtained from, and only valid for, statistical averages to individual phenomena. Similar difficulties appear if one endeavours to apply the old laws in which electricity was regarded as composed of continuous fluids to phenomena involving single electrons.

The real difficulty lies in attaining the habit of regarding mass, charge and action as fundamental units. Unless a physicist thinks in terms of electrons his usefulness is very small. Probably in future it will appear that he must think also in terms of atoms of action. He may not think of an inverse square law of force but of a series of orbits whose axes increase as the squares of the natural numbers. A quasi-elastic restoring force may be represented to his mind by a succession of orbits with axes varying as the square roots of the integers. Or perhaps instead of thus substituting a relation between mass, charge and action and length for our present relation between mass, length and time and force he may choose other terms and find other concepts. In any event it seems likely that some reconsideration of the convention that mass, length and time are the fundamental concepts is called for, and progress may well require that they be replaced. If, as the above seems to show, a system can be found which leads naturally to the results of the Quantum Theory, there seems every reason for the physicist to adopt it.

Should this point of view be right the Quantum Theory involves nothing mysterious or even startling. But it does seem to lead us to doubt the view usually taken that all systems of fundamental physical concepts are equally valid. The set mass, length and time lead to difficulties, the set mass, charge and action do not. Whether other sets may yield the same result seems doubtful;

but the set mass, charge and action seem to be distinguished clearly in nature by the discrete atomic structure of the ultimate parts. Variations of any one of these quantities can obviously only take place *per saltum* and their values can only bear whole number relation to one another. To endeavour to reconcile this fact with the classical mechanics is meaningless. As well might one think it necessary to reconcile the occurrence of electrons and protons with the classical electro-dynamics. The apparent conflict is really psychological, induced by the fact that we describe events and phenomena in the unnatural terms of length, mass and time, instead of in the natural terms of mass, charge and action. If we could accustom ourselves to these latter and think in terms of them, there seems little doubt that the apparent difficulties of the Quantum Theory would disappear and the so-called discontinuities would seem as natural to us as does at present the atomic constitution of matter.

The solution of the quantum problem suggested here is in some ways but a logical sequel to the first step in the emancipation of the mind from convention represented by the principle of relativity. Space and time, though reduced to sections of a four-dimensional manifold, were left all their old reality and validity as fundamental concepts. The quantum phenomena urge us to withhold even this last tribute to their former universal dominion. But although this releases us from the age-long fetters of length and time as the proper forms of representation of physical phenomena and forces us to realize the arbitrariness of the convention which imposed these abstractions on our mental processes, our freedom is short-lived, for the quantum phenomena in their turn seem to indicate clearly that certain concepts have a singular position in nature and that physical processes can be described more simply in one set of terms than in any others. All our terms, mass, length, time, charge, actions, force, etc., are but different aspects of reality. Modern physics tells us that only

integral multiples of certain ultimate units of mass, charge and action occur in nature. Any other set of concepts leads to incommensurable relations. It seems reasonable therefore to ascribe to this particular set of concepts or aspects a special significance, and to describe natural events rather in terms of the linkage of units of masses, charges and actions rather than in the conventional aspects of masses, lengths and times.



IV. *By* H. WILDON CARR.

BEFORE it is possible to indicate the philosophical problem which is raised by the Quantum Theory, it is necessary to understand quite unambiguously what that theory affirms in physics. The easiest way to understand this is to refer to some familiar concepts in the history of philosophy, and particularly to concepts which arose before philosophy took a divergent direction from that of positive science. Descartes conceived movement as an externally imparted activity, imposed from without on matter or extension, constant in quantity and indestructible. Leibniz, criticizing this concept, replaced it with the concept of force, that is, an essentially internal originating activity. Modern physics has replaced both these concepts, movement and force, with the concept of energy. Of this energy movement is the kinetic form, force the latent. Contemporary experimental research in physics has enabled us to trace to its ultimate source the energy of the physical universe. We are as far as ever from understanding its metaphysical nature or its metaphysical origin, but we have discovered its ultimate home so far as physics is concerned. Energy has been traced to its origin in atomic oscillations. It is emitted and propagated in undulations whenever the electron of an atom is disturbed in its orbital revolution, that is, when it changes from one orbit to another. If we take what we believe to be the simplest atom, the hydrogen atom with a single electric charge on its nucleus and a single negative electron, we find that the orbit of this electron is not fixed or permanent, under certain conditions or influences the electron will change from one orbit to another. The fact on which the Quantum Theory is based is

the strange and inexplicable discovery (inexplicable on the classical theory) that these orbits are not a compact series, they are not infinite in the mathematical definition, they are a definite number: physicists tell us there are about thirty. The energy is only emitted in discrete quanta and not continuously. We may put it in another way. The observational fact is not the atom itself, but its spectrum. The spectrum of hydrogen is a definite number of lines and not a continuous band. The spectrum is a statistical fact, a mass effect. If, therefore, the atoms producing this mass effect were material systems obeying the law of the inverse square, the emission of energy would be continuous, there would be an infinite number of orbits presenting an undivided spectrum.

But why, we may ask, do physicists want a Quantum Theory? It is the peculiarity of facts that they impose themselves on us and are indifferent to our *a priori* constructions or anticipations. It may seem then that in this case we have simply to accept the facts and that this is the end of the matter. We may speculate. We may suppose that the strangeness of the discovery is due to some defect in our power of observation or to some limit in its extension. We may even hope that a super-spectroscope will one day bridge the gap which is disconcerting us. It is not so. There is a quite peculiar necessity behind the demand for a Quantum Theory. The reason we must have a theory is that in the science of electro-magnetism the facts are not simple observations such as we conduct on the plane of our ordinary experience, they are interpretations which wholly depend upon a principle. It is with the classical principle in electro-magnetism that the new fact comes into contradiction. What, then, is the classical principle? It is the principle which seems to govern the movements of the universe of our ordinary perception, and it is expressed in Newton's laws of motion. Just as Newton conceived the idea that one formula would serve for the fall of an apple and for the revolution of a planet, so we conceive that

the principle which governs our ordinary observations of sense experience holds good for the infinitely little and the infinitely great. All these celestial and terrestrial movements are interpreted by us as continuous. We suppose, for example, that the moon's velocity of revolution is being continuously retarded by the action of the tides it occasions, that its orbit is therefore continuously changing, and that the two masses are coming closer and closer together. We cannot be said to observe this, it is simply a direct application of the principle of the inverse square to our observation. It is, in fact, the meaning of the Newtonian gravitation formula.

I have taken the problem of the spectral lines merely to illustrate the difficulty. It is neither the original nor the most striking of the observational facts which contradict the classical theory. I choose it because it seems to me simpler to understand and easier to explain than black-body radiation and the other phenomena which originally led to the formulation of the Quantum Theory.

The philosophical problem with which we are presented closely resembles the famous Greek problem of Achilles and the tortoise. In fact, the analogy is perfect. To ordinary observation Achilles moving by steps (quanta) overtakes the tortoise, yet theoretically each step requires as its *a priori* condition that it should exhaust an infinite series of stages, and therefore overtaking the tortoise is an impossibility.

It is a significant fact that this very quantum problem appeared in psychology at the first attempt in the last century to bring psychological phenomena within the scheme of physical and mathematical causation. The Weber-Fechner law attempted to equate changes in quantitative physical stimulation with changes in qualitative sensation. It devised a formula, but the formula proved too limited in its application to be of any theoretical value. There is a sense, for example, in which it is true

that it is the last straw which breaks the camel's back, and yet there are no imaginable conditions under which the suffering animal can be held to appreciate the addition or subtraction of a straw from its load. We find indeed that throughout the whole realm of sensible experience all the qualities of things are mass effects and are selected according to some principle. Take the colour scale, for example. Mathematically we schematize it as a continuous difference of frequency of light waves, but sensed colour is a selection of frequencies widely separated from one another. Colours are massed groups giving an average statistical resultant, but as distinct and as discrete as the lines in the spectrum.

The usual explanation is well illustrated in the psychological theory of the specious present. Theoretically the actual present is a mathematical point without duration which divides the past from the future. Actually it is a quantum of duration. We generally interpret it by assuming that the physical reality geometrically conceived as space and time is mathematically determined and divisible to infinity, but that the mind has a subjective hold over the flux, in memory and imagination, and is thereby able to hold the real moment in an illusive subjective reinstatement of the non-existent past and future.

There is nothing, then, in the least extraordinary in the mere concept of quanta. It enters of necessity into the interpretation of all psychical phenomena, of all the data of sensible experience. What is extraordinary and unaccountable and revolutionary is to find ourselves obliged to introduce it into physics. There it appears peculiarly out of place and even self-contradictory. It is rational to conceive a *minimum sensible*. It is irrational to apply the principle of a *minimum sensible* to what is by definition insensible, and, as simple fact, far beneath the threshold of discriminating consciousness. Hitherto we have always assumed that scientific reality, the other of thought, must conform to the

necessities of thought when we think mathematically, and quantitative continuity is one of the mathematical postulates. The *minima sensibilia* offer a limit to the sensible apprehension of reality, but offer no limit to the intelligible nature of reality.

I now come to the distinctively philosophical problem. With the theoretical physical problem, how we are to construct conceptually the atomic system consistently with the phenomena observed by the spectroscope, I am not concerned. The physicist is inquiring what law is to replace the Newtonian gravitation formula. Whatever it is it must apply universally and it must also account for the successful working of the law of the inverse square at the plane of observation represented by ordinary human experience. But behind this physical problem there is an essentially metaphysical one. I will try to state it. What is the true relation between the concept of a physical reality completely amenable to mathematical quantitative methods, and the concept of a physical reality essentially qualitative and indifferent to measurement? It takes us to the heart of the scientific problem. Which is primordial, the sensed experience or the scientific object?

Leibniz tells us that when he first studied the metaphysical problem of the ultimate constitution of the reality of the physical universe he was strongly attracted to the Democritean concept of atoms and void. We know that he came to discover the atomic theory unworkable and self-contradictory and he rejected it decisively, but it never lost its influence over him. It led him to set to work to think out what are the real atoms of nature. The simple substances which alone can be conceived as essentially indivisible are active forces. These he named monads. But with his new concept of the monad or simple indivisible activity he introduced also a new concept of the continuity of the universe. Instead of a containing space and time, the Newtonian postulates, he conceived a living universe, every constituent of which was

distinguished by the nature and range of its activity alone. What does nothing is nothing and what a thing does that the thing is.

The principle of relativity seems to me in what is essential in it to be a scientific formulation of this concept of reality. There are differences due to the different line of approach, but the fundamental thought is the same. For example, the activity of the monads according to Leibniz consists in perception alone; the activity of observers of nature, according to Einstein, consists in mathematical co-ordination from the standpoint of a system of reference experienced at rest in relation to systems conceived to be moving. In each case it is quite clear that the principle of continuity is not to be looked for in an objective container but in an active co-ordinator.

Let us now turn to the question set for our symposium. There are three clearly distinguishable concepts of continuity. The continuity which psychology is concerned with is purely a continuity of function to which structure is altogether subservient. It takes the form of personal or individual identity and is the continuity of living experience. With this continuity the Quantum Theory is not concerned directly, and it only becomes relevant by way of analogy. The analogy may indeed prove to be significant, but the scientific inquirer can regard psychological continuity as a subjective identity, and can abstract the psychical function entirely from its material content. It can appear without any necessary relation to a physical and mathematical continuum. The mathematical and physical concepts are in a different category.

The mathematical conception of continuity combines in its definition two predicates which, taken abstractly, are directly contradictory—discreteness and compactness. The continuity of space is defined mathematically as an infinite series of points or positions, and therefore as absolutely discrete, and the infinity

of the series is defined by the negation of contact. No member is next another and between any two points there is another. So also with the continuity of time the instants are points and the process succession, and the compactness of a period consists in no two instants being next one another so as to exclude an intervening instant. What the Quantum Theory shows is that when space and time or whatever is conceived as occupying space and time are treated objectively and conceived mathematically, they cannot serve as the basis of the continuity which physics requires. More than this, the mathematical concept directly conflicts with the experimental results. This does not imply that the mathematical concept of continuity is to be rejected as false or abandoned as useless, or that it has been found wanting as an adequate analysis of space and time, the formal elements of experience. Quite otherwise. What it shows is that the continuity of physical reality is of an entirely different order to mathematical continuity and analogous to psychological. Physical reality consists of quanta which are constants and indivisible. Such quanta are in mathematics a self-contradiction.

Let us not call in question the truth or utility of mathematical concepts, for our present inquiry there is no reason why we should, but let us try to suggest the reason why in the Quantum Theory mathematical concepts fail. I will offer my suggestion. It is a necessary consequence of the discovery of the energetical nature of physical reality, of the discovery that its constitution is ultimately dynamical and not material, not inert and not statical. In so far as the physical reality of the universe involves the notion of action, of becoming, of enduring, of changing—that is, of concepts into which time-process enters as a fundamental condition, concepts for which, as Kant showed, time is a schema—continuity must postulate indivisible quanta.

And further, if the fundamental reality of nature is action, then the continuity of nature must be conceived as process, and

it follows by a clear logical necessity that a time schematization is more original than the spatial terms into which action may be analysable, or than the states in which alone it is representable. The mathematical definition of continuity as the infinity of a compact series is only applicable to a static condition, and static conditions are derived not original, it is meaningless and even self-contradictory when affirmed of the concrete process itself.

The Quantum Theory is a necessary consequence of the discovery that the basis of physical reality is not matter but energy.

III

THIRD SESSION: *July 12th, 1924, at 3 p.m.*

Chairman: MISS BEATRICE EDGELL.

SYMPOSIUM: THE TERM "LAW" IN PSYCHOLOGY: WHAT ARE ITS IMPLICATIONS?

By A. W. WOLTERS, J. L. MCINTYRE AND ISRAEL LEVINE.

I. *By* A. W. WOLTERS.

THE standpoint adopted in this paper is that expressed by Herbart, "Die Gesetzmässigkeit im Seelenleben gleicht vollkommen der am Sternenhimmel." Believing this to be the necessary postulate of any natural science I desire to initiate a discussion on some of the implications of the term law in relation to psychology, and in particular to urge that it is necessary to harden our terminology and our concepts. Psychology is here regarded as a natural science based entirely upon, and maintaining loyalty to, observed fact, and departing from observed fact to pursue speculation only with misgivings. It has to adhere to the spirit of the other special sciences, while free to work out its own methods. With so short a tradition behind it, it is important that it should keep alive to the ultimate requirements of systematic theory. At present, in spite of the activity and enthusiasm of workers in the science, there are

signs both of weakness and of apathy as regards system. Sooner or later we shall be forced to face broad questions and problems of outlook will then become acute. Starting, then, from Herbart's postulate, I hope to see discussed whether current psychology is sufficiently true to the conception of scientific law, and also whether this concept is adequate for the construction of a theoretical system. This will bring up for discussion other concepts often proposed as supplementary. No justification is required for raising these questions at a philosophical meeting, for though we may think it better to work independently we are closely concerned with each other's results.

To start with a few very commonplace remarks about the term *law*, we may say that it means for science the statement of a reciprocal relationship between two or more phenomena or groups of phenomena, which have been isolated by the mind from the continuum in which they are found. Such a law is accepted as having universal validity within the system for which it is stated, and in consequence it can be taken as a basis for predicting events. The wide philosophical question as to the rational foundations of prediction need not be raised; whatever the fundamental principle may be which justifies the extension or projection of knowledge into an unobserved future, it is the same for physics and psychology. The ideal law is thoroughly reciprocal: if A, then B, no B unless A, A and B having each been defined to a high order of precision. Any approximations to this ideal which science actually possesses have been reached by a gradual refinement of coarser statements. It must be confessed that psychological laws, so often and variously appealed to, at present cut a poor figure alongside those established in other sciences. This need not affect our discussion, which is concerned more with the goal than with achievement. Though it is true that any general work on psychology offers but a poor array of carefully formulated laws

yet there are many statements of observed relations which are laws in embryo.

A familiar example will illustrate this. If a number of observers are shown series of random letters for a tenth of a second, they will on the average discriminate, say, four and a-half. In a rough sense this is a psychological law, but a rudimentary one only, and not up to the strict standard of science. There is a lack of precision brought out quite clearly by the fraction that has to be stated in the results of the experiment. To formulate a perfect law would require us to be able to predict from observation of other characters who would read four and who five, and whether the observer who had discriminated four on this occasion would read five on the next. There is no prospect of doing so as yet, and the variability of living creatures compels us to invoke the methods of statistics. But has the fact of variability any more positive significance than that knowledge is incomplete and not precise? No fair criticism, however, can be directed against psychology on the ground of its imperfections so long as its aim is clear and true, and so long as it refuses to be beguiled into false tracks. It is just here that the danger lies. It is too often assumed that the notion of law is insufficient and that it needs to be helped out by other concepts. The chief ground for this assumption is that law does not explain, and other explanatory concepts are introduced to supply the defect.

It seems to me a mere truism that science can never explain, if to explain means to answer fully the question "why?" Its function is to describe systematically, to exhibit its selected aspect of the universe as an ordered array of mutually dependent events, understanding by dependent that no member of a system of events can occur without the occurrence of the others. Perhaps even metaphysical systems can do no more. Psychology, like other sciences, has done its utmost when it has

described this phenomenon and that and colligated them so as to reveal them as an instance of a general pattern of connexion. Make the net of colligations as extensive as you please, you will catch no explanation in it. The description of the system of phenomena and the statement of the conditions necessary for the occurrence of events is the end of the story. I am, of course, aware that we speak frequently of scientific explanation, but no more is intended by the term than that a particular sequence is brought under a general principle or an event brought into relation with others through general principles. Scientific explanation is more adequate and detailed scientific description.

This modest conception of psychology implies a radical determinism. I fail to see that progress could be made from another standpoint. It may be granted that the assumption of determinism is not proven and that it may well be that in the end we shall be confronted with psychical events that resist inclusion in determinist categories. At that point psychology stops, and the study of the new features must be left to those hardy enough to essay to know the indeterminate. But so long as we are working at all with the hypothesis of determinism, the hypothesis that empirically established laws are valid, it is impossible to admit the claims of its opposite. I see no reason to suppose that our hypothesis will be found inadequate. Both common observation and specialist study bring to light uniformity underlying variety, and in essence these uniformities are laws. It would be easy to show that all human intercourse depends upon uniformity of behaviour and the possibility of prediction that it furnishes. It is seldom realized how much of human behaviour we accurately foresee, of man in general and our friends in particular. Since it is impossible to predict the indeterminate, the initial hypothesis of system and regularity is justified. But the advocacy of determinism may be regarded as opening the old controversy of mechanism and teleology.

On this I propose to say but little. I would suggest that so far as psychology is concerned the controversy is misguided. When psychologists are charged with holding mechanistic theories wherein do they really sin? It can hardly be supposed that they imagine that mental process exhibits the same laws as physical entities that can be weighed. If no more is implied than that psychical events are determined the charge is to be welcomed. But why speak of mechanism? Possibly the use of the term as one of reproach is due to two factors, an imperfectly recognized supposition that determinism implies transeunt causation, and a belief that this is inadequate for a description of mental life. If so, two alternative defences are open to us. We may maintain that determinism does not necessarily involve the conception of a *vis a tergo*, or that if it does the theory yields a better formulation of the facts than any other. The former defence has already been offered implicitly. We cannot explain the existence of a series of phenomena, nor attach meaning to the statement that one event actively causes another, whether mechanically or otherwise. To say that B is determined by A asserts nothing more than that B does not occur without A. That is, there is a definite pattern of events discoverable. Knowledge may be extended by filling in details between A and B, and by discovering that the pattern is more rich and complex than the first attempt at description grasped. It is undeniable that patterns exist amid psychical events and this implies determinism, but there seems no reason to introduce the term mechanism (except as a very crude and unfortunate metaphor). In any case we have to follow where the facts lead us, and there is no ground for the warmth of feeling displayed by Dr. McDougall in his recent book (*An Outline of Psychology*, 1923).

“ Volition . . . is still the working of the conative impulses that spring from the instinctive dispositions, impulses working,

not sporadically and in detachment from one another, but within a delicately balanced and more or less harmonious and unitary system. Does it then follow that we must accept the determinist position, must deny completely all freedom of the will, all power of voluntary decision to influence a course of events which has been predetermined from the beginning of the world? Or may we believe that the course of things is not strictly determined and predictable, and that human decisions are what they seem to be, real determinants, new beginnings from which new lines of determination run on into the future? To me it seems that all we know of nature and of the human mind justifies the latter alternative" (p. 447). The first sentence is surely a statement of determinism if it really means what it says. In the two following an escape is found by begging the question with the term voluntary decision. I have no need to deny that voluntary decisions are real determinants. The question is whether processes called by that name are not themselves determined. And for the rest, if we cannot at least predict what parts of the future are essentially unpredictable this is a most uncomfortable world.

He proceeds as follows: "The determinist argument explicitly stated runs in some such way as follows: Similar (or the same) causes produce similar (or the same) effects. This human decision is a similar effect, therefore it has a similar cause. This syllogism is obviously foolish. Both its premises are gratuitous assumptions; and in no way can we establish premises from which the determinist conclusion follows. If it be said that some such major premise as "all events are strictly determined or caused" is a necessity of thought, we may point to the various scientists and philosophers who tell us that any such assumption is ridiculous, that the notion of cause and effect has always been obscure and muddled, incapable of being clearly thought or expressed, and that, however useful it may have been and still may be in a limited way, it has had its day and now is merely a

clog on speculation." Except for the gratuitous identification of causality with determination all this is sound. If we use the term cause it is just a trick of speech, since Hume. But the argument in no way touches the real point at issue. Take again the clearly stated points on p. 30. "The chief of these assumptions (*i.e.*, of mechanistic psychology) are : (1) that mechanistic physiology will at some remote date prove adequate to the task that lies before it, namely, the working out of a complete description and explanation of the bodily processes of organisms (including the human organism) in terms of the mechanistic principles of physics and chemistry ; (2) that it is, or may become, possible to give an intelligible account of the relation between the facts of experience and the facts of behaviour, in terms compatible with such mechanistic physiology." On this it is sufficient to say that determinism in psychology does not depend on mechanism as there defined, and that as regards the second point it is premature to adopt either the positive or negative of the position. It remains to be seen which way more complete knowledge will seek its formulation.

But the real charge is, I think, that psychologists who adopt this attitude are too prone to express their theories as if dependence were asymmetrical, arranging their facts always with reference to the past. There is much force in this objection. Must we not, then, accept the teleological principle that present behaviour is only explicable in relation to a future event, and in that case can we still hold to determinism ? An animal, we say, attains its goal by a process of trial and error. Can each point of the sequence of movements be regarded as determined by the preceding ?

Speaking first quite generally, determinism need not involve a reference to the direction of time, unless the date is regarded as a relevant character of the event. Suppose A, B, C, are events taken to be instances of a law, and occurring in that

time order. Ordinarily we state the latter in terms of the former, but this is not necessary. If the formulation of the law is perfected the relationships are reciprocal, as we have already seen, and you can state the facts from either end. A does not occur without C. Practical interests have made it more usual to adopt the forward-looking order, since man's primary purpose is to control the future rather than to know the past. Yet we do even in physics work back from present data to earlier phenomena, which in a way is predicting the past. The pattern in which events are included can be studied from either end, and indeed it is not fully known until it has been examined from both points of view. That events occur in a certain time order gives no ground for believing that one "causes" another. Once more all we can know and all we need is law. To take the familiar example of the rat in the maze wandering until it finds its food, one may accept teleology without abandoning determinism. The earlier movements are unintelligible (form no coherent pattern) without the final term, but equally the final term is unintelligible without the earlier.

A more thoroughgoing retort could be made to those who over emphasize the importance of teleology. It might conceivably be shown with sufficiently detailed knowledge that the rat's first trial movements were dependent upon its original position, the characters of the physiological organism and the consciousness of the presence of food, and the next set by its position and so forth at the end of the first, and so with the remainder, as the Behaviourists would reduce sequences of actions to chain-reflexes. I confess to a belief that a more useful and systematic description could be given in this way than by merely filling out the formula--the creature seeks an end. But both statements are imperfect, for the one does not give sufficient weight to the cessation of search activities when the food is found, the other overlooks the fact that the rat was hungry, an essential condition for the

experiment and one earlier in time than the rest of the phenomena. The whole sequence is a unity, and exhibits a complete pattern which must be viewed as a whole. When the rat is hungry it seeks food, when it seeks food it is hungry. In its modest way this statement is a law, and if we can state its terms more completely the law will be sufficient.

So with the human agent. When he struggles to complete a mathematical construction he is working towards an end, and so you may say that the future, the as yet unrealised, is determining the present activities. But the vague foresight of what is required is a *present* process without which the succeeding stages would not occur. We may be right in holding that a better insight into human life is obtained by considering the rounding off of the series of activities as the cardinal event, but the other method is equally legitimate and there is no real opposition. By all means give full weight to the striving for ends, but determinism is not thereby weakened. The uniformity of the ends men seek and of their methods of pursuing them points to the existence of definite patterns in human life and behaviour. The reign of law is as complete in mental life as in the starry heavens.

There has recently been a tendency to introduce the concept of energy into psychology. The motive is probably the desire for explanation by reference of the system of facts to something beyond them, in the hope of carrying the integration of data to a higher degree than empirical law alone can do. To introduce the term is at once a challenge to the position maintained in this paper and a claim to add to knowledge. It does not constitute a new attack upon determinism, if the word energy is to retain anything of its original significance. On the contrary, it would re-inforce the view that we have rejected, that the course of events is determined by a *vis a tergo*.

The introduction of the concept of mental energy (in whatever terms it may be stated) into psychology seems to me a thoroughly

retrograde movement. A term is borrowed from physical science, in which it has had a long history, and applied to facts of a quite different order. We must presume that in doing this it has been cut free from all its most definite meaning, and that we have also discarded as far as possible even the less definite significance which almost inevitably accompanies it, and which is proper to physical systems only. It is doubtful whether such a complete abstraction is possible, certain that if it be achieved the word "energy" has become a bare sound. In its proper sphere energy has a clear mathematical definition, and beyond this it has a rich mental context. For its concrete meaning is found in the equations which connect the measurements of physical phenomena. To speak of physical energy is to assert the existence of these and to refer to them. Put the equations aside and the term has no scientific value. No doubt there is a subtle conscious implication of something very mysterious and wonderful getting things done, but this is only a vestigial trace of a more rudimentary way of thinking, a remnant perhaps of the appeal to occult powers. The scientist does not *mean* this even when it unwittingly colours his thought. The function of the term is to serve as a shorthand symbol for equations. Cautious inquiries have led me to suppose that physicists are realizing this more and more and finding the term less useful as knowledge clears.

If so, it is unwise to bring it now into psychology. Mental energy cannot be observed as an entity, it cannot adduce the equations that its physical counterpart denotes, so what reputable meaning can be assigned to it? If it is to serve for explanation it must be firmly defined and shown to be necessary. Discussion of the latter point need not arise until the firm definition is offered. At present mental energy is only a nebulous something standing behind phenomena and explaining them, being the cause of their existence. But it is at least doubtful whether the

notion could ever really explain phenomena of the physical order, much less can it do so here where it has no clear connotation. And if it does not explain it certainly adds nothing to description and so is useless. There is a problem, but this is not the way to solve it. We need to find a connexion between the simpler empirical generalizations, but this can only be done by the formulation of laws of a second order. The introduction of the term mental energy looks like a desperate effort to avoid the trouble.

The test case for this discussion is found in the psychology of instinct, and it is to this that the argument has been addressed throughout. It is all to the good that this sphere should receive the attention it now does. We have been recalled from the bloodless abstractions of academic psychology and there is hope that the facts of human life may be confronted without blushes for the inadequacy of our science. But there is much looseness of thought. It is time to protest earnestly against much of the terminology and formulation which is current. The offending phraseology speaks of instincts as "urges," "drives" and "forces," and "libido" is no better. If this is the final statement psychology has wandered from the scientific track. Take the word "urge." In physical terms we may picture a person being propelled along a path by a policeman. We are now invited to picture all human behaviour as roughly, very roughly, typified by that analogy. The forces urging the subject are, I suppose, immanent and not external, but they are relatively to him impersonal, and there is an active push from somewhere. What is the justification for speaking of an urge?

External observation of behaviour shows only physical movements, described as directed towards ends. We cannot observe an urge, but only events occurring in series. The examination of animal behaviour, apart from anthropomorphical prejudices, would not give rise to this idea. The appeal is then

made to our consciousness of impulse. There can be no dispute as to the existence of this experience, but the theoretical interpretation need not, and should not, take it at its face value. Commonplace phrases allude to a sense of impersonality in the stream of events, as if the determinants were impersonal. The impulse may be felt as the rise of a blindly irrational desire. For its complete development as a conscious process resistance (either internal or external) seems necessary, for if nothing occurs to check the impulse the experience is less intense. Taking it, however, in the most vivid form you can imagine, it does not immediately follow that this is *the* determinant of behaviour. Modern physiology at least suggests the hypothesis that the felt impulse and the behaviour (at least in its outlines) are collateral, and both determined by physiological conditions. I do not deny that the conscious process may be a determinant, but maintain that it is not the determinant, and that the impulse has to be brought into relation with other conditions. Whatever weight you may assign to the experience there is no justification for speaking of urge or drive as if these words added to knowledge. To do so is to promote a popular phrase into a scientific theory.

Any conception of force, however disguised, must meet the general philosophical criticisms here as elsewhere. If you take it as an entity it cannot be defined or shown. Define it, and it proves to be a systematic principle, implicit in the facts and adding nothing to them.

To follow this line consistently entails a criticism of the use of the word "instinct." Used as a substantive to which verbs can be attached it is very misleading. Too much of its old implications as an explanatory concept still clings to it, with the suggestion of an intangible force which causes phenomena. A passage from Dr. McDougall's "Social Psychology" will illustrate this. "We may say, then, that directly or indirectly

the instincts are the prime movers of all human activity ; by the conative or impulsive force of some instinct . . . every train of thought, however cold and passionless it may seem, is borne along towards its end, and every bodily activity is initiated and sustained. The instinctive impulses determine the ends of all activities and supply the driving power by which all mental activities are sustained. . . . These impulses are the mental forces that maintain and shape all the life of individuals and societies, and in them we are confronted with the central mystery of life and mind and will " (6th edition 1912, p. 44).

With the central idea of this passage I am in full agreement, but I do not think it a useful way to state the facts. Instinct is defined on p. 29 as an "inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner." But the psycho-physical disposition is hypothetical and an abstraction, so abstract as to be all but empty. We might conceive an inherited physical disposition, for there is at least the hope that it might be revealed to observation, but the psychical disposition is pure speculation, and it is not clear what it is that is assumed by the term. I do not deny mental inheritance, but it cannot be regarded as the inheritance either of an entity which can be denoted by a noun, or as a modification of such. To put the matter bluntly, to assume a "disposition which determines behaviour" means only that we expect the behaviour to occur, and this expectation is better formulated in a carefully stated law than by appeal to abstract mythological entities. Psychology cannot afford to be picturesque.

The data consist of behaviour. Amid its variety we are aware of a pattern that is common to many series of actions.

In virtue of certain characters of the pattern, viz., that all the members of a species exhibit it and that the pattern is independent of the previous experience of the agent, we apply an adjective to it and call it instinctive behaviour. For this usage there is a definable meaning, and we refer to observed facts and to nothing else. But the use of the substantive is a useless abstraction from this, unless it be defined simply as law of behaviour.

There are two difficulties to be met. One is that the laws of behaviour are left rather in the air as irrational empirical generalizations. This is due to incomplete knowledge. We may reasonably expect that further analysis will bring them into relation with other laws, perhaps those of physiology or heredity, so that the determinants of any piece of instinctive behaviour may be fully revealed.

The second is of greater current interest. Any reaction-pattern called instinctive displays much variation in its details. Trial and error play their part, experience modifies behaviour, and the creature displays persistence when baffled. So much has recently been written on this (the most fruitful aspect of instinct for human psychology) that there is no need to furnish detailed examples. We have to consider whether variation can be reconciled with law. I would insist first upon the paucity of our knowledge of the determinants of action. Ignorance will not prove or support our position, but it does suggest that it would be premature to forsake a method tried and sound in other spheres. Earlier in the paper I pointed out that law is an ideal and not a realization, and the laws of instinctive behaviour are still very shadowy. The final scientific statement will be of this form: In these circumstances the creature behaves thus, both circumstances and behaviour being precisely defined. At present we can only say that in circumstances of this kind the creature does this sort of thing, a statement which at the most is only law in germ. There is no reason to doubt that the

statement will become more precise with more detailed observation, and none for abandoning the search. But I fear that progress will come to a stop if we are content with drives and urges and striving towards a goal. Having once assumed an urge why trouble further ?

The final contention of this paper is, then, that the psychology of instinctive behaviour needs to be rewritten in a more coldly scientific manner. Upon the success with which this is done depends the development of the whole psychology of human behaviour, and thus it is not without interest for philosophy. There are perhaps more immediately urgent tasks, but let us accustom ourselves to this way of thinking, and recognize that speculative concepts are out of place. The writer dissents from the presuppositions of the psychology that has taken the name Behaviourism, but we must acknowledge that its adherents show a genius for investigation and a precision of statement that are admirable. The essentials of their method are valid outside their theory. Psychology has to construct a system of precisely formulated laws, recognizing that the only scientific explanation of a phenomenon is to assign it to its place in the whole system.

II. *By J. LEWIS MCINTYRE.*

I AM in complete agreement with Mr. Wolters as to the reign of law in the mental world, and as to the need of formulating the laws in precise terms. Psychologists have recently been endeavouring to supply this admitted deficiency in their Science; but there is little uniformity in the laws proposed. Thus, Spearman, in his *Nature of "Intelligence" and Principles of Cognition* (1923), points out that the word "intelligence" in its ordinary present-day use possesses no definite meaning; this is apparently characteristic of most of our psychological terms. He deprecates the frequent recourse to physiology and biology: "A discomforting suspicion arises that psychology is just that domain where the evolutionary theory has begotten its minimum of sound science and its maximum of facile excogitation" (p. 27). What is required in the present puzzling state of psychology is some system of principles, or ultimate laws. "Deeper than the uniformities of occurrence which are noticeable even without its aid," a true science "discovers others more abstruse, but correspondingly more comprehensive, upon which the name of laws is bestowed. Bottommost lie a certain number of these laws which are not explicable by anything further, but rest in their own good right. These should be all-comprehensive; every process which can be observed within the domain of the science which they underlie either ought to be subsumed under them, or at least should offer a reasonable prospect of being so subsumed eventually" (p. 30).

The volume proceeds to offer three of these fundamental laws of psychology, and five subordinate, quantitative, or "secondary" laws. Of the former group, the first is that "Any

lived experience tends to evoke immediately a knowing of its characters and experiences." The other two refer to the knowing of relations. Of the second group, the first is that "Every mind tends to keep its total simultaneous cognitive output constant in quantity, however varying in quality," This is called the law of mental energy: the others are the laws of retentivity, fatigue, conative control, and "primordial potencies" (pp. 131 ff.). It is hard to understand why some of them should be called "laws" at all. Even the first principle is not all-comprehensive, as the word "tends" reveals: a "lived experience" may exist in which neither characters nor self (or subject) are known, and among the conditions which prevent the realisation of the tendency (pp. 165, 166) are inattention, fatigue, want of practice, inferior native ability, and fugitiveness of the data: some, if not all, of these are admittedly physiological rather than psychological in their nature. Thus even the primary law, which was intended to present a purely psychic characteristic, is found to imply a reference to the physical organism in its statement.

Woodworth (*Psychology, a Study of Mental Life*, 1922) is similarly conscious of the need of laws, but from a purely practical point of view: "To the psychologist, conduct is a matter of cause and effect, of natural law. His business is to know the laws of that part of Nature which we call human nature, and to use these laws as fast as discovered, for solving the problems presented by the human individual or group." (p. 18). In chapter 16, "The Laws of Association: an attempt to reduce the learning process to its elements," after pointing out the greatness of the problem, and the generations of psychologists who have given their best towards its solution, he proceeds to try to "summarize our accumulated knowledge in the form of a few great laws. We wish also to relate our laws to what is known of the brain machinery" (p. 389). An example may be given in the Law of Effect (Thorndike's): "The linkage of a response

to a stimulus is strengthened when the response is a success, and weakened when the response is a failure. Success here means reaching the goal of an awakened desire or reaction-tendency, and failure means being stopped or hindered from reaching the goal." Probably, however, this law can be reduced to the first law, the Law of Exercise, as Woodworth suggests.

The German psychologists are working in the same direction ; among others R. Pauli and J. Lindworsky have recently published systems of psychological principles. After stating four of these, the fourth being, " The subjective life-processes do not occur by themselves, but only in connection with objective life-processes, in such a way that a functional dependance holds between the two." Pauli adds that " These four principles are the most general psychological facts ; they are realized in every single observation, and thus influence problem and method in all investigations, as the presuppositions of which they may be considered " (*Psychologisches Praktikum*, p. 4). Lindworsky (*Zeitschr. für Psychol.* 89, 1922), while recognising that psychology is still far from the systematic unity of the older physical sciences, in which large groups of facts are derived from a few assumptions, postulates, or hypotheses, and verified by experiment, believes that at no distant future psychology will have overcome this defect, and he has presented a first attempt at unification in his work (*Experimentelle Psychologie*, 1921) and in the paper referred to above. The first law is that all phenomena of consciousness occur in an experiencing subject—a subject-consciousness, not necessarily a self-consciousness ; and the second is the fundamental psychophysical law—that " when a nervous process has a certain constitution or nature (unknown to us) there occurs, parallel to it, a change of consciousness " ; to the equality, likeness or difference of psychophysical process (neural process) will correspond equality, likeness or difference of psychic process (*Zeitschr.*, 89, p. 325). Here belong groups of facts such as those

of "specific energy of sensory nerves," the Weber-Fechner Law, "perseveration," "reminiscence," etc.

A final, and extreme, illustration of the kind of "laws" which are being thrust upon us from undigested physiological theories is to be found in Maxwell Garnett's interesting work on *Education and World-Citizenship* (1920). In the second book he states five "laws of thought," of which the second is that "Excitement in any nervous arc tends to spread to every other arc that is connected with the first, through synapses, the insulation of which the excitement in question is intense enough to overcome" (p. 69); and the fourth, which rejoices in the name of the *Law of Free Will*, is that "Will, measured by the general factor g , can reinforce the excitement in any excited system of higher level arcs" (p. 129). The psychological part of this work is a valuable systematic account of the psychological facts and theories bearing upon education, but I submit that the above can hardly be considered "psychological laws" in any sense of the term.

It is obvious that there are two distinct meanings in which the term "law" is being used: (1) a statement, in precise terms, of the nature, constitution, essential structure or "form" of the thing—the "continuant," I shall call it, after W. E. Johnson -- which is investigated by the given Science. Of this type are Lindworsky's and Spearman's first principles or laws. Such a law is really equivalent to a definition, and is based on analysis and abstraction. It states the "simple natures" involved in the continuant, its properties, and, if possible, the way in which they are combined. Such a law is, of course, universally valid, provided the analysis is accurate and complete, and the abstraction justly made. I imagine, however, that the formulation of such principles is a task for philosophy, not for the sciences themselves.

The second kind of law is one which states a uniformity of coexistence or sequence of events, occurrences, or changes, in one continuant, or in a number of continuants, in relation to each

other. Such a law Karl Pearson refers to as a "brief statement or formula which resumes the relationship between a group of facts" (*Grammar of Science*, 2nd ed., p. 81): or "It is the *résumé* or *brief expression* of the perceptions and conceptions (i.e, those of man) and exists only when formulated by man . . . Such laws simply describe, they never *explain*, the routine of our perceptions." The "explanation" of a fact of observation could mean only its subsuming under one or more of these summary laws: the "explanation" of a law only its simpler and clearer statement. It is in regard, then, to such laws in psychology that the question of implications arises, and the illustrations given above will show that there is urgent need of a solution. In particular, the constant appeal to physiological "conditions" of mental facts requires some justification.

1. Neither in psychology nor in any other science does a "law" imply any kind of enforcement from one "continuant" upon another, body upon mind, for example, or mind upon body. There is no mysterious influence which passes from one to the other, determining each to be what it becomes. The determination is primarily that of thought, of the mind of the observer: on account of this determination of his mind he predicts and controls: and in proportion to his success, his conviction of the "validity" of the law deepens and hardens. What it is that brings the success—why B *does* occur, as he predicts, when A is already given?—To this question no satisfactory answer can be made.

There is certainly no implication in psychological law of what I suppose to be meant by the "mechanical" type of causation—namely, that at a given moment the changes that occur in mind or organism are completely explained and "determined" by the conditions in mind and body and environment at the moment immediately preceding. The mechanical interpretation of behaviour, for example, would mean the reduction of human life to physiological and thence to chemical and physical processes:

no such explanation can come within the sphere of psychology, for which—as it is urged below—the psycho-organism is the unit of investigation. Every form of behaviour has its “ground” in the psycho-organism as a whole: explanations of sensation, perception, memory, dreams, by the neural processes in the cortex are mechanical indeed, but they are not psychological nor adequate explanations. Shand’s criticism of earlier psychology is in this respect completely justified—that it detached the processes of perception and thought, feeling and will from their base in character: “We have what purports to be a science of those processes, while that which alone directs and organizes them is left out of account as if it had no importance” (*Foundations of Character*, 2nd ed., p. 1). The unity of the organism is implied in all its reactions. Psychology has mistakenly concentrated its attention upon processes that are apparently simple, but are merely abstractions. When an event occurs in mental life, there are three factors which jointly constitute what may be called the cause of the event—viz., the continuant, the property of the continuant, and some occurrence to which the event in question succeeds, and which would commonly be called its “cause.” In the case of behaviour, for example, we would have the organism, its property of “experience,” and a stimulus, occurring at a particular moment, as the joint cause of the event—a “sensation of red,” say, and the corresponding behaviour (W. E. Johnson, *Logic*, Pt. III, (Ch. VI).

2. *Objective Psychology and Behaviourism*.—Piéron (Scientia, 1915) has remarked that he does not regard “objective” psychology as a *new* psychology: it represents “an attitude, an affirmation which is new, but which was already implicitly taken up by experimental psychologists. The existence of a psychological science implied the objectivity of its methods and of its data.” But he also urges that the movement as a whole implies renouncing the claim that consciousness has any “efficacy,” any influence

which would "perturb the determinism of objective phenomena which psychology seeks to make precise." Let us discard for the time being such words as "material," "physical," and the like. The laws of psychology must be expressible in terms of objective fact, involving no transition from objective to subjective, no leaping backwards and forwards between the two. However important for philosophy the "subject of experience" may be, it is in psychology a general condition, and may therefore be left out of account, as it is in other sciences (Ward, *Principles*, p. 17 ff., who, however, comes to the opposite conclusion). It is not the "subject" which is the concern of psychology, but the psycho-organism. When it is argued that the psychologist's standpoint must be subjective, "that to eliminate consciousness . . . is to abolish what is characteristic of psychology" (*ib.* p. 24), it seems to me to be a view which is not borne out by Dr. Ward's own work. What we aim at knowing is how the psycho-organism in such and such circumstances will behave: the circumstances include those of its history, of past happenings to the organism: but, given complete knowledge of all of them, psychologists should be able to predict the behaviour, and given the behaviour, to declare what circumstances have preceded it. It is, however, quite unnecessary to exclude introspection from objective psychology; on the contrary, inward observation gives knowledge of certain objective processes which we do not know in any other way. When a child, seeing a yellow daffodil, stretches out its hand and plucks it, the extreme behaviourist will describe the phenomena which are given to *his* perception; the colour and form of the daffodil, the attitudes and movements of the child, the time-relations and space-relations involved in stimulus and reaction, the reaction itself including facial expression, possibly verbal utterance, and the like; and he will *infer* between the stimulus group and the reaction group of phenomena a set of complicated processes in the child's brain. Meantime,

let us suppose, the child is aware of the coloured object, has an enjoyment of the brightness and beauty, a desire and an impulse to possess it; it is surely a mistake to suppose that all this, occurring between the action of stimulus on the eye and the beginnings of the bodily reaction, is purely irrelevant. The contents of the child's awareness are also bodily facts—the daffodil, the tension of his muscles, heightening of his own bodily activities, etc. He simply knows directly what the behaviourist (the observer) infers. I should like to argue that the observer, supposing him to have perception of the child's inner organic processes—including those of nervous system and brain—would then know in one way what the child knows in another. Just as I may feel, see and hear the vibrations of a large tuning-fork different ways of being aware of the same "thing"—so I might conceivably "see" in another person's organism what he "feels" as pleasure or pain, emotion, activity and the rest. In other words, the behaviourist is mistaken if he rejects introspection where it is possible. His science does not become less objective by the use of such data. There are not, then, two continuants in the psycho-organism—one spatial or extended, the other psychic (the experient); spatial continuant and experient are one and the same.

3. *Parallelism and Interaction.*—It will be seen that my argument requires neither parallelism nor interaction as an implication of law in psychology. We would therefore be relieved from the innumerable discussions as to *how much* of the mental life is dependent upon brain process, and as to whether or not mental activity produces or effects physical changes. Both Spearman and Lindworsky, for example, insist that the apprehension of relations and correlative processes are purely psychic, without any physiological correspondence. Both admit that sensation and memory and association are dependent on brain process, and that volition implies action from the mental upon the physical. From the standpoint of a purely objective psychology

there is no question of influence of mind upon body or of body upon mind ; nor, on the other hand, is there any meaning in saying that a mental process " accompanies " or " corresponds to " a physical process ; there is no such existence as a " mental " process, if by that we mean a process occurring in and to consciousness. Nothing happens in or to consciousness : it is the organism which is conscious, now of this, now of that, in and to which events happen. It is true that every experience seems to imply interaction ; the child's senses are acted upon by the colour of the flower, and the life of the flower is cut short by the child's desire. The difficulty is that of thinking that a brain-process should (1) cause the awareness of the yellow flower to take place (in a totally different realm of existence from its own), and meantime (2) proceed by " diffusion " or otherwise to excite a motor centre, and thence action in the outer world ; concurrently with (2) the awareness of the yellow flower, having developed within the mind to perception, excites (3) desire and will there, the satisfaction of which is given as (4) (the end-result of (2)), the appreciation of the softness of the flower in the hand, etc. Whether we read the sequence in terms of parallelism or interactionism, it is equally unthinkable. May I suggest the following as an alternative : if we assume, with realism, that the knowing is direct, and not meditated by a " sensation " as a psychic representative of the physical thing, then we have still to explain why just that particular thing is cognised at the given moment. It still seems to be the brain-process that accounts for this act. The physical does not cause or produce consciousness, or knowledge, but it directs the knower, causes this particular knowing to occur. Let us suppose now that the knowledge is already " there," implicit, for each psycho-organism ; indeterminate at first, but gradually revealed, and made explicit from time to time, now in one part, now in another, as the *needs of action* determine ; that this mirroring of the universe becomes more complete and perfect,

as the interrelations between the physical organism and its environment become more complex: the cortex, being the integrative centre for these physical interrelations, and not otherwise specially correlated with consciousness, awareness, or enjoyment—the psychic aspect. Then it is the flower acting upon the child's organism that "leads" through retina, nervous process, glands and muscles to the reaction, the main determinant in this sequence being the organism itself as this definitely constituted thing, containing its history in itself. This is from the observer's point of view. But for the child itself the *same* real event is otherwise known. He is aware of the colour and form of the flower, memories, perhaps, of past experiences, anticipation, desire, purpose—all expressible, as I believe, in objective forms. This is the child's point of view. For both observer and child, if the latter had adequate expression, there would be determinism in the process: but for neither would there be mechanical causation, since in both cases it is the "nature" of the organism, as it at the moment is, that mainly determines the result. This is not the occasion for developing this argument, but it would, I think, dispose of the incredible "transeunt causality" between mind and body; and it could be applied to memory and to anticipation as well as to sensation and perception.

4. My position, if adopted, would make for economy of treatment in psychology. For instance, terms like "mental energy," "psychic disposition," "mental impulse," "the psychic aspect of instinctive behaviour," would be unnecessary. Lloyd Morgan (*Brit. Jour. of Psych.*, 1921), in a paper on "Instinctive Behaviour and Enjoyment," asks the question what is it that behaves in instinctive behaviour?, and answers that it is "an organism—not an organ or part of an organism, though these are included, but the organism as such and as a whole"; and speaking of *impulse* as the "focussing of a preparatory disposition on some action at the moment of actual behaviour or just before

that moment," he adds that it is neither the disposition nor the impulse that acts, but the animal, or the psycho-organism. McDougall argues that in such a case as nest-building in birds there is (1) a physical "disposition" (physiological, chemical, etc.), and (2) a psychical disposition, part of the structure of the mind, determining perception, impulses, and behaviour alike. The second of these is a pure assumption, and is unnecessary: it merely duplicates the first. Neither "disposition" nor "impulse," on their psychic side, are ever described in any but objective terms. The disposition and the impulse are in the organism, and of the organism: their "enjoyment," as Lloyd Morgan uses the term—the psychic aspect—is, of course, a reality, but, as I have tried to show, it is not a *separate* reality, not distinct in existence from the organism "that behaves."

I have suggested then—(1) that there are discoverable laws in the sphere of psychology, as of any other science; (2) that they are formulæ in which observed sequences and coexistences are summarised and made available for prediction and control; (3) that the subject-matter of psychology is the living organism and its behaviour: the "ultimate" laws will represent laws of behaviour; (4) that the data, the occurrences, sequences and coexistences between which the laws hold must be homogeneous: hence any transition between body, for example, as extended in space, and mind, as a distinct existence, inextended, and "experient," cannot come within the laws of psychology: psychology must be purely objective; (5) the laws imply determinism, but not mechanism or material "causation"; (6) the philosophical implication of law in psychology appears to be some form of monism—neither parallelism nor interaction.

Neither "event," nor "process," nor "change" are unambiguous terms in psychology, but the discussion of *their* implications would carry us, I think, beyond the limits of our present question.

III. By ISRAEL LEVINE.

THERE seem to me to be two distinct sets of questions raised by the title of this symposium. One relates to the implications of law for psychology itself, and the other relates to the implications of law for metaphysics. If it be objected that the second set of questions is irrelevant, that psychology is a natural science similar to every other natural science, and can safely ignore so-called metaphysical problems, the objection refutes itself: for the assumption that a science of psychology is possible, and the further assumption that it is a natural science similar to other natural sciences, constitute already metaphysical theory of a disputable character. Psychology cannot shake off its metaphysical implications at will. In particular, the implications of law in psychology raise a metaphysical issue of the very first importance.

The implications of law for psychology itself present, in fact, no problem at all. As the very title of this symposium indicates, psychology must postulate law in its data before it can begin its construction. Spencer expressed this somewhat bluntly in this way. "Psychical changes," he writes, "either conform to law or they do not. If they do not . . . no science of Psychology is possible" (*Principles of Psychology*, I, p. 503). In other words, the essence of all scientific procedure is to colligate particular phenomena, to reveal the system, or uniformity, or law underlying the manifold of sense-data. Law, in fact, is virtually the

same conception as science itself. Once it is assumed, therefore, that a science of psychology can be constructed, it is at the same time assumed that the data of psychology will exhibit uniformity or law. All this seems to me a truism, and I agree with the standpoint of the two preceding papers in so far as it makes this position explicit.

It is in the implication of psychological law for metaphysics that the real difficulties, in my view, appear. It seems at first sight as though determinism were necessarily implied. Both Mr. Wolters and Dr. McIntyre take this view, but they proceed to rob the admission of its sting by arguments which will distinguish determinism from mechanism or any form of material causation.

These arguments do not seem to me convincing. Mr. Wolters holds that determinism merely refers to the existence of definite patterns of events, not to any *vis a tergo* or transeunt causation. It is, therefore, not to be identified with mechanism. But his whole view of psychology seems to me to lead straight to mechanism. How are we to reconcile the claim that "determinism in psychology does not depend on mechanism" (as that term is defined in a passage quoted from McDougall) with the previous statements that "psychology is a natural science based entirely upon, and maintaining loyalty to, observed fact," and that it "has to adhere to the spirit of the other special sciences?" If, too, mechanism and teleology differ only in respect of the direction or time-order from which we trace the pattern of events in question, if "there is no justification for speaking of 'urge' or impulse," if what McDougall calls "the central mystery of life and mind and will," in another quoted passage, merely represents an abstract mythological notion, how does such a position differ from mechanism except in name? Determinism and mechanism seem to me identical, on Mr. Wolters's premisses, and though he makes a brilliant effort to

escape the mechanistic implication of his position, I do not think it is successful.

Dr. McIntyre similarly refuses to accept the apparent logic of the situation, and insists that determinism is not mechanical causation. He suggests that the determination in question "is primarily that of thought, of the mind of the observer." It is, in other words, a mental category. Whether reality is so constituted as to justify the application of this category he regards as a question to which "no satisfactory answer can be made." But the dualism of mind and reality which is apparently suggested here is rejected in the next paragraph. Mechanism is not legitimate, it is argued, because "the psycho-organism is the unit of investigation for psychology." "The unity of the organism is implied in all its reactions," and every form of behaviour is grounded "in the psycho-organism as a whole." The contention thus urged is no doubt sound, if psychology is to be freed from the perplexities of the body-mind *impasse*: but I cannot see how it bears on mechanism, and how it disposes of mechanism. Dr. McIntyre admits, as we learn at the close of the paper, that the philosophical implication of law in psychology is monism. If, then, reality is taken to be the same in character everywhere, what difference does it make whether we speak of a conscious mind or a responsive psycho-organism? The fact, however we describe it, must testify to law in the same way as the facts of physics or chemistry.

Dr. McIntyre tries to avoid this consequence by invoking a metaphysical theory somewhat similar to that of Spinoza. The inner organic processes, he suggests, are one aspect of what from another aspect is called conscious experience. "Just as I may feel, see, and hear the vibrations of a large tuning-fork--different ways of being aware of the same 'thing'--so I might conceivably see in another person's organism what he 'feels' as pleasure or pain, emotion, activity, and the rest." In this way we certainly

escape the difficulties of both interaction and parallelism. But we do not escape the difficulties of determinism. It is perhaps significant, I think, that Dr. McIntyre should reach the conclusion he does. For it is in the philosophy of Spinoza that we find the clearest, most ruthless exposition of determinism and all it implies. It may prove not a little instructive to glance at that philosophy now for any light it may throw on the present problem.

In the Third Part of the *Ethics*, Spinoza presents (claiming to do so for the first time in the history of philosophy) what he calls a "scientific" treatment of mental phenomena. He is going to examine, he says in a prefatory note, human actions and human desires exactly as though he were examining "lines, planes and bodies." In another work he indicates that he regards the passions as mere "properties" of human nature, "just as pertinent to it as are heat, cold, storm, thunder and the like, to the nature of the atmosphere" (*A Political Treatise*, Chap. I, Sect. 4). Here, then, is a frank acceptance of law in psychology. What is the general philosophical position bound up with Spinoza's psychology? It is determinism in the most complete form. "There is in no mind," he says, "absolute or free will, but the mind is determined for willing this or that by a cause which is determined in its turn by another cause, and this one again by another, and so on to infinity" (*Ethics*, II, prop. 48). The world is for Spinoza shot through and through with necessity. Everything is what it is, not as the result of chance, not even to subserve some purpose of an external creator, but simply because of its nature. All things have been predetermined by God, who exists and acts merely from the necessity of His nature. The notion of human freedom is an illusion, born of our ignorance of the causes of things; and the doctrine of final causes is a foolish relic of human conceit and misconception. Such is determinism for Spinoza.

No difficulty presents itself to Spinoza from the relation of psychical and physical. Reality is one, though it appears to our understanding under two aspects, body and mind. Each of these attributes comprises the whole of reality, or substance, so that the hypothesis of interaction is gratuitous. To attribute bodily action to a mental cause is for Spinoza merely "to confess with specious words that we are ignorant of the cause of the said action" (*Ethics*, III, prop. 2, schol.). The body cannot determine the mind to think, nor can the mind determine the body to move. Volition is just "the affirmation which an idea, in so far as it is an idea, necessarily involves" (*ibid.*). Spinoza surely satisfies the plea of Mr. Wolters, at the beginning of his paper, for a "hardening" of the terminology and concepts of psychology. "No one," Spinoza writes, in words which a Behaviorist might well echo, "has thus far determined what the body can do. . . . No one has yet had a sufficiently accurate knowledge of the construction of the human body as to be able to explain all its functions" (*ibid.*). Recent work on the endocrinous glands seems to do credit to Spinoza's vision.

Law in psychology, then, if Spinoza is to be our guide, implies determinism in this ruthless, consistent sense. If we take a more modern guide, the apostle of law in mental life is Freud, the founder of Psycho-analysis: and in his case, too, we reach just the same result. Freud claims, for instance, that even the errors of every-day life, such as the use of a wrong word in a speech or the mislaying of a key by a Hausfrau, are significant of purposes usually unconscious: and if it be objected that this is a somewhat extravagant view, that such occurrences are mere "accidents," Freud replies, "What is meant by this? Does the objector mean to maintain that there are any occurrences so small that they fail to come within the causal sequence of things, that they might as well be other than they are? Anyone thus breaking away from the determination of natural phenomena, at any single

point, has thrown over the whole scientific outlook on the world " (*Introductory Lectures on Psycho-Analysis*, p. 21). In other words, "The belief in psychic freedom and choice is quite unscientific, and must give ground before the claims of a determinism which governs even mental life" (*op. cit.*, pp. 87-88).

The implications of this view for general theory of life are strikingly similar in Spinoza and Freud. Freedom and progress are just illusions. "We are driven about by external causes," Spinoza says, "in many manner of ways, and, like waves agitated by contrary winds, fluctuate and are unconscious of the issue and of our fate" (*Ethics*, III, prop. 59, schol.). Similarly, Freud stresses the inexorable laws of reality, of the task-mistress, necessity, as the ultimate explanation of what we regard as development. There is no room in his system for some inner power in man himself which can transcend the laws of nature and mould its own course. "Many of us," he writes in a recent work, "will find it hard to abandon our belief that in man himself there dwells an impulse towards perfection which has brought him to his present heights of intellectual prowess and ethical sublimation, and from which it might be expected that his development into superman will be ensured. But I do not believe in the existence of such an inner impulse, and I see no way of preserving this pleasing illusion" (*Beyond the Pleasure-Principle*, p. 52).

The insistence on law in psychology, then, if we are to judge by Spinoza and Freud, seems to lead to a philosophical determinism of some kind. Although Mr. Wolters and Dr. McIntyre have both tried to elude the mechanistic consequences of determinism, they have not, in my view, succeeded. Such is the (negative) result of the discussion so far. What follows, then, it may be asked? Are we to say, as James does, that "the question of free-will is insoluble on strictly psychologic grounds?" (*Principles of Psychology*, II, p. 572). Or are there any links in

the chain from law in psychology to determinism itself which may yield to renewed pressure ?

(a) It must be remembered, in the first place, that psychology is a reconstruction of experience, not experience as lived or "enjoyed." It may be granted that the possibility of such a reconstruction requires us to postulate law in psychic data. As Mr. Wolters puts it, from no other standpoint is progress conceivable. But what exactly does this involve ? Only, it seems to me, that the human understanding is so constituted that it thinks all its data in terms of law, that it interpolates law, so to speak, into all its material. What demands inquiry, then, is the origin or explanation of this peculiarity of the understanding. Is law a mental category which has been imposed on the organism, embedded in its structure, from past dealings of the organism with reality, and does it follow that reality is itself a sphere of universal law, order, system, all through ? Or may it be argued that this category of law originates in the realm of physical being, that the intellect is an instrument which has been evolved to deal with physical or spatial realities, in which sphere it has indeed been uniquely successful, but that it is illegitimate, and will lead to nothing but confusion, to apply the same category of law indiscriminately to a realm of being, the psychical, where it is not appropriate ? These are the alternatives. The former is the true determinist hypothesis, involving monism, and, as I believe, some form of mechanism. The latter, I think, suggests an escape from mechanism, but implies a definite metaphysical dualism.

(b) Monism is thus the critical link between law in psychology and determinism. Spinoza makes his standpoint on this question quite explicit, for, in the passage quoted above, where he begins the scientific treatment of mental life, he expressly points out that "Nature is always one and the same everywhere." In both the preceding papers a metaphysical monism is accepted.

Mr. Wolters insists that psychology is on the same footing as any other natural science, and adds that "whatever the fundamental principle may be which justifies the extension or projection of knowledge into an unobserved future, it is the same for physics and psychology." Dr. McIntyre, it has already been mentioned, admits the implication of monism explicitly. We have narrowed down the issue, then, to this single metaphysical question.

Can we escape from determinism, then, by the hypothesis of dualism? I think it is possible. To interpret experience on a dualistic hypothesis means to interpret it as the clash, or meeting, of a free, creative life-force or reason or spirit and a determined, law-revealing matter. It is useless to protest that interaction is "unthinkable." It is a difficult hypothesis, no doubt. But if the facts seem to indicate the working of mind or spirit in and through matter, it is better to interpret the facts accordingly than to rule out the interpretation to suit the exigencies of an abstract dogma or theory. Dualism is not by any means out of date. Dr. W. E. Johnson, in his most recent volume on the logical foundations of science, frankly recognizes its necessity. He adopts, he tells us at the outset, "the dualistic position," which "recognizes a fundamental distinction between the psychical and the physical, and attributes reality to both in the same unequivocal sense." He admits that this view has philosophical difficulties of its own, but, at any rate, he goes on, "any examination into the principles of science would seem to be impossible without some such hypothesis as that of dualism" (*Logic*, Part III, p. xix).

(c) It may be pointed out, further, that even the transition from law to determinism is not at all certain. If we inquire into the roots or ground of law as a scientific postulate, we can carry the analysis beyond such conceptions as uniformity, invariable sequence, and the like. All that law connotes, in the last resort, is a feature of reality which we may call permanence.

Bertrand Russell has shown, in his *Analysis of Mind*, how much suspicion can be attached to notions of "invariable antecedent," cause and effect, and the others. It is legitimate only to ground law in permanence, I think. In respect to the physical universe permanence may be construed as uniformity, definite "patterns of events," laws of molecular behaviour. But in respect to mind it is at least premature, if not extravagant or arbitrary, to construe law in the same terms. Law certainly implies permanence, that is, the living organism, with mnemonic capacity and some power of integration. The only laws so far discovered in psychology are just these properties of the organism (or continuant, as Dr. McIntyre prefers). Whether the further progress of psychology will reveal in mental phenomena patterns or uniformity analogous to the patterns or uniformity of physical changes is the crucial problem. At present, as Mr. Wolters says, psychological "laws" in this sense "cut a poor figure alongside those established in other sciences." It seems to me at least doubtful, therefore, whether law in psychology should necessarily be assumed at this stage to involve uniformity, invariable sequence, and the like. All that can safely be said is that the living organism has the capacity of forming habits and a power of integration. In this way, then, the transition from law in psychology to determinism becomes at least uncertain.

On these grounds, therefore, I suggest it is possible to weaken the logical chain from mental law to determinism and mechanism. It is a question, on my view, of doing justice on the one hand to the requisites of scientific procedure, and of retaining, on the other hand, the conception of life, or mind, or purpose, without which experience, in the last resort, must lack interpretation. The position I have outlined is admittedly tentative. It may be that Spinoza was right, that the synthesis of psychology and the physical sciences is approaching, that reality is the same all through. In that case law in psychology implies determinism,

the so-called values of life are illusions, born of human ignorance and vanity, and progress is an empty fiction. It seems clear, therefore, that the business of psychology is to proceed with its task, for on its future results hinge issues than which none can well be graver. But the time is not yet, I have claimed, when the "sentimentalists" need be ashamed of their logic.

IV

FOURTH SESSION: *July 12th, 1924, at 8 p.m.*

Chairman: PROFESSOR G. DAWES HICKS.

SYMPOSIUM: "CRITICAL REALISM: CAN THE DIFFICULTY OF AFFIRMING A NATURE INDEPENDENT OF MIND BE OVERCOME BY THE DISTINCTION BETWEEN ESSENCE AND EXISTENCE?"

By J. LOEWENBERG, C. D. BROAD AND C. J. SHEBBEARE.

I. *By* J. LOEWENBERG.

Critical Realism, a co-operative study of the problem of knowledge,* does not lend itself to a summary statement for the following reasons: (1) The point of view which it represents is enmeshed in a net of polemical themes. Connoting generic kinship with other types and forms of realistic belief but denoting specific divergence from them by the adjective "critical," the essential nature of this point of view emerges only after non-critical versions of realism are seen to be inadequate. It is very difficult to keep separate the "critical" and the "polemical" aspects of this doctrine. (2) While it is true that about the fundamental tenets the seven co-authors are in substantial

* *Essays in Critical Realism*. By D. Drake, A. O. Lovejoy, J. B. Pratt, A. K. Rogers, G. Santayana, R. W. Sellars, C. A. Strong. Macmillan & Co., London, 1921.

agreement, the several versions of them are by no means identical. Conflicting trends between them are, in fact, not hidden from the discerning reader. In particular, with regard to the use of the term "essence" there is amongst the different critical realists an extraordinary divergence of emphasis, such use in its varying contexts ranging all the way from the indispensable to the negligible. The expositor of this composite work is confronted with a dilemma. If he select one version as authoritative, the authors of the others may urge not without justice that the specific points raised by them could not be ignored without doing violence to the many-sided nature of a doctrine, the result of deliberate co-operation. And if he attempt a quintessential account of all of them, phrasing in his own words a harmony of the various views, what are the chances of its authenticity not being challenged by those who profess the true faith? (3) A difficulty still more serious is involved in the question as formulated for this Symposium. Is it to be understood in an epistemological, or is it to be taken in a metaphysical, sense? Whether it is possible to affirm "a nature independent of mind" may be regarded as a question paramount for metaphysics, but as altogether irrelevant to the problem of knowledge. For it is one of the cardinal principles of Critical Realism that dissenting opinions upon metaphysical topics need not preclude the possibility of agreement with regard to a solution of the epistemological problem. Despite the fact that the authors of the work before us are actually wedded to different ontological views, they "have found it entirely possible," so at least they declare. "to isolate the problem of knowledge," and to agree on a common solution of it.

I mention these difficulties to indicate that my task is not a simple one. Nevertheless, in what follows I shall make the attempt to liberate Critical Realism from its polemical context, to interpret what is distinctive about it in terms not necessarily

identical with those of its several proponents, and to look for those ontological implications to which a doctrine that takes seriously the separation between "essence" and "existence" is ineluctably committed. But since it is allowed on all hands that to Mr. Santayana belongs the glory of having made the discovery of essence for this new theory of knowledge, it is but fair that I should be permitted to view as pre-eminently orthodox his particular version of Critical Realism. It is, therefore, his utterances that I shall be obliged to cite most frequently, not only those found in his contribution to the co-operative study referred to, but also those which he has voiced in his later work (*Scepticism and Animal Faith*), where the divorce between essence and existence is decreed to be final.

The significance of the term "essence" -- a name given to the datum of immediate awareness -- in distinction to that of "existence" which pertains, not to the datum, but to the object of knowledge, cannot be appreciated without a preliminary analysis of what the critical realists assume to be constitutive of the cognitive situation, as exemplified particularly by the perceptual experience, it being one of their pre-suppositions, nowhere examined with sufficient explicitness, that the perceptual pattern is the sole pattern of cognition. This pattern, they hold, is a tripartite one, perception being a relation between three and not, as is commonly assumed, between two terms, *i.e.*, a mind perceiving and an object perceived. For the act of perception performed by the mind involves immediate awareness as well as mediate belief, each -- the awareness and the belief -- related to different terms. Perception, when viewed as a synthesis of immediate awareness and of presumptive knowledge of facts, demands a precise discrimination between three logically separate factors: (1) a mind or an organism capable of both intuition and belief, (2) the data as they appear to intuition, data being what we are immediately conscious of, and (3) the

outer objects believed to exist in their own proper medium, to which the apparent characters apprehended in intuition are assumed or presumed to belong. When I perceive I intuitively apprehend characters which I irresistibly believe to be the characters of an existent object—this, in plain language, is typical of the cognitive situation as discerned by Critical Realism. Is there such an object? And does it possess the characters which I attribute to it? Such questions are relevant in so far as my perception is presumptive (*i.e.*, is a form of belief about the existent object) and not in so far as it is intuitive (*i.e.*, is immediate acquaintance with data). The difference between a veridical and a non-veridical perception is a difference ultimately between a true belief and a false belief. The distinction between the true and the false—on whatever grounds it may be said to rest—does not concern intuitions. Abstracted from the belief that the data as given in intuition are the characters of existents, the intuition always is a veridical experience: it is an indubitable apprehension of an “apparent”* datum; whether the datum corresponds to an existing object is a question that need not be raised until the intransitive intuition is transformed into a transitive belief. Intuition, “which neither has nor professes to have any ulterior object or truth, runs no risks of error, because it claims no jurisdiction over anything alien or eventual.”† To put it briefly: intuition is not knowledge and data are not objects. Knowledge is inseparable from a belief more or less precarious that the data present to direct intuition are actually the characters of independent existents.

Crucial for Critical Realism is the concept of the datum. What is it? I have already indicated what for Critical Realism

* “The datum is apparent in the sense of being self-evident and luminous; and it is apparent also in the sense of merely appearing and being unsubstantial.”—Santayana, in *Scepticism and Animal Faith*, p. 43.

† *Ibid.*, p. 70.

it is not. (1) *The datum is not an object of cognition.* The object of cognition is transcendent in the sense of possessing characters proper to its own being and existing in a realm of manifold external relations. It is a complex thing lying or moving in an enormously complicated context. Such an object intuition, owing to its intransitive nature, is obviously debarred from reaching; it can only be reached (if reached at all) by a transitive process of mediation by means of which the datum of intuition is irresistibly taken to be a character pertaining to a self-contained object. That the datum of intuition has some relation of affinity to the object of cognition may be postulated on various grounds, but can never be deduced from the datum itself. The ultimate distinction between object and datum lies in the transcendence of the one and in the immediacy of the other. (2) *Nor is the datum an existent fact.* "I propose to use the word existence," says Mr. Santayana, . . . "to designate not data of intuition but facts or events believed to occur in nature . . . Existences, from the point of view of knowledge, are facts or events affirmed, not images seen or topics merely entertained.* Existence on this view is something adventitious, something super-added by belief. It is neither affirmed nor denied by intuition which is acquainted with data only, data being ideal characters which a mind capable of transitive belief as well as of intransitive intuition imputes, often erroneously, to existing objects. Whether the characters apprehended intuitively are or are not the characters of existing facts is always problematic, something to be investigated and demonstrated; the whole question of existence is of the nature of a reflective hypothesis which, like all hypotheses, demands verification before it can be declared legitimate. What alone is "given" to perception, when the given is purged of that which belief attaches to it, is

not the object as it exists in its own *milieu* but only as it appears to an ephemeral intuition. Existence, therefore, is a category absolutely alien to the datum in so far as it is a datum. Whether it is or is not embodied in an existent is wholly irrelevant to its nature. (3) *Nor is the datum a state of mind.* It can only be regarded as such when confused with the intuition of it. The intuition is indeed a psychical fact in a mind; it enjoys an existential nature and habitat; and is capable (sharing as it does the transcendence pertaining to all existents) of becoming an object of transitive belief. But the datum present to such an intuition is no more psychical than it is physical. "Nothing given is either physical or mental, in the sense of being intrinsically a thing or a thought; it is just a quality of being."* The arguments that may be employed in showing that the datum of an intuition is neither an object of knowledge nor an existent fact suffice to prove that it cannot be a state of mind, since a psychical state enjoys existence—i.e., is a fact or an event believed to occur in the life of an organism, and may on occasion become an object of cognition.

If that of which we are immediately aware (the datum) is not an object of knowledge, is not an existing fact, is not a state of mind what is it then? A datum, according to Mr. Santayana, "is . . . a theme of attention, a term in passing thought, a visioned universal. The realm in which it lies, and in which flying intuition discloses it for a moment, is the very realm of non-existence, of inert or ideal being."† It is an essence. Here emerges *le mot juste* for what is given. Essence is the concept that designates properly what we should mean by the datum of intuition. The identification of the datum with an essence denotes that the datum is merely "a quality of being" which

* *Ibid.*, p. 92.

† *Ibid.*, pp. 54-55.

it "inherently, logically, and inalienably is";* that it is a logical universal having complete individuality in the sense of appearing just as it is directly and clearly; and that it is an ideal character defined by instant apprehension and as such, when deprived of all adventitious significance imputed to it by belief, is no manifestation of anything beyond itself. The recognition of the datum as an essence is a recognition of it as a character possessing reality, or being, but not existence; as an indefeasible entity of pure intuition to which alone "positive experience and certitude are confined";† and as a mere symbol or sign for the knowledge of existences. When thus viewed, the datum of intuition, abstracted from all belief about it, emerges as something that has a *logical* status, a *universal* nature, and a *neutral* or --- to use Mr. Santayana's expression---an omnimodal signification.

It may now be seen why Mr. Santayana's principal concept plays in Critical Realism such a dominating rôle. It owes its central position to a number of felicitous denotations, of which I have just distinguished three. Even those critical realists who have no fondness for the term "essence" and who use it with extreme reluctance are unable to dispense with the major ideas with which it is inextricably associated. It is necessary to speak a bit more fully of the ideas denoted by essence. In the first place, an essence denotes something logical. This does not mean that the nature of an essence is necessarily rational: it merely signifies that the being proper to logical entities and relations is precisely the being proper to essences. In defining the datum as an essence therefore, it is defined at once, not as physical nor as mental, but as something that has the sort of being possessed by all logical entities and relations. That the original

* *Ibid.*, p. 74.

† *Ibid.*, p. 100.

datum of perception, whether it be called an essence or by some other name, is an entity of the type belonging to logic is one of the contentions concerning which all the critical realists appear to be in agreement. In the second place, an essence also denotes universality; and in saying that the datum is an essence we do not confuse it with a particular existence which is the object of a belief, such an object having a definite locus in a particular context, to which (rightly or wrongly) we are attributing the essences as they arise before our intuitions. Only because the data of intuition are universals can they constitute the descriptive elements employed in perception whenever it takes the form of belief. Essences are given before things can be clearly perceived, since "they are the terms used in perception."* The data of pure intuition could have no relevancy (of any sort) to ulterior things, however difficult it may be to demonstrate such relevancy, if the data, capable of being identified with the characteristics of existents, were not universals. It is because of their universality that essences may be conceived as partaking of natures as different as are the data of intuition and the objects of belief. And that the ultimate datum of perception is a universal is affirmed by all the critical realists, even by those who are least prone to describe it as an essence. And, finally, an essence denotes also something neutral in the sense that it is an ideal term charged with no special significance. As they are "given" all essences are equally immediate, equally complete, equally luminous, equally indefeasible. This has an interesting bearing upon the question concerning the primary and secondary qualities of matter. For Mr. Santayana, for instance, it is a false problem, resting on the pre-supposition that the data of sense are constituents of the thing as it exists in its own right. The traditional dichotomy between primary and secondary qualities vanishes on the theory that the

* *Ibid.*, p. 94.

data of intuition and the objects of perception belong to separate realms of being. From the point of view of intuition all qualities are essences, and, being essences, they are omnimodal; while from the point of view of belief they are equally true as signs for objects or events occurring in nature. The orthodox bifurcation of nature into primary and secondary qualities has on this theory no more ultimate justification than it has on Mr. Whitehead's. So-called primary qualities are simply those essences which artificial custom or conventional science has taught us to use in our description of things, at bottom as symbolic as the secondary ones; the latter when taken indicatively, *i.e.*, when taken as signs, "are just as true as the primary."* All essences, then, are as such omnimodal: though devoid of significance when taken abstractly or purely, they are equally true in a double sense. They are true in being eternally what they are for pure intuition, and they are true in being proper signs or terms for transitive belief.

With the aid of "essences," denoting terms or themes that are logical (*i.e.*, non-physical and non-mental), universal, and neutral, being the data of intuition and the signs for the objects of belief, we can now discern three different but related aspects of realism to which this view of the cognitive situation would appear to be committed, if by realism we designate the general theory (implied in the question formulated for this Symposium) that of reality we may "affirm a nature independent of mind." Such a nature can be affirmed of the three levels of reality—if we may speak of them as levels—with which, according to Critical Realism, cognition is necessarily concerned. One realm of being—non-physical and non-mental—is made up of the essences as apprehended in direct intuition; another is comprised of the particular facts and events (be they physical or be they mental)

* *Ibid.*, p. 87.

to which existence is imputed by a transitive belief ; a third is constituted of the same facts and events as they exist in their own transcendent medium unaffected by our cognitive experience and, strictly speaking, never invaded by it. To all these three realms belongs a realistic mode of being from the point of view of the mental acts that seek commerce with them. Let us discuss each in turn.

(1) The first realm—the realm of essences—exemplifies a realistic ontology in a very definite sense. Essences as essences have no existence, but whatever being or reality they enjoy is independent : they cannot lose or change the logical character that is theirs “indefeasibly” and “inalienably.”* The radical independence proper to essences is of two sorts. Essences are independent of existence and they are also independent of the intuitions that peruse them. There are many senses in which essences may be said to be independent of existence. (a) Existence, as we have already observed, is a category entirely alien to the nature of essences. It makes absolutely no difference to their intrinsic being whether or not they happen to be embodied in some existing fact. (b) Existing facts exemplify a relation of one-sided dependence : it is they that depend on essences for their characters (not their real characters, perhaps, but certainly those imputed to them by belief), since it is impossible to predicate of any existing thing any term that upon analysis would not turn out to be an essence. “Essences are not drawn out or abstracted from things,” says Mr. Santayana, “they are given before the thing can be clearly perceived, since they are the terms used in perception.”† (c) The realm of essences is infinite. Their very nature demands their infinity. Being ideal characters and intrinsic possibilities they constitute an “infinite continuum” or

* *Essays in Critical Realism*, pp. 181, 182.

† *Scepticism and Animal Faith*, pp. 93-94.

an "infinite labyrinth"—*the expressions are Mr. Santayana's—of indiscriminated, unintuited, and unembodied shades and modes of being; they are thus ontologically prior to the limited circle of essences which the world of existence may actually contain or which our fugitive intuitions may at any moment accidentally hit upon. But it is the second sort of independence—independence of the intuitions of them—that determines the realistic nature of essences. Intuitions are, of course, themselves existents; and this alone might suffice to establish the ontological priority of the essences over the intuitions that apprehend them, since the argument that essences are independent of *all* existence must also hold of the restricted class of facts comprised of existent intuitions. The realistic independence of essences over against their intuitions must be sought, however, in the nature of the essences themselves. That intuition "has an object whose whole reality is independent of such a perusal of it,"† is due to the character of this object: it is a universal term incorruptible and immutable, "which borrows nothing whatever from the observer except its presence to him, which is perfectly adventitious to its nature, and not indicated there."‡ Any essence, therefore, which my intuition accidentally comes upon is independent of this intuition and would possess its precise character and identity if my intuition had never occurred, or if I had never been led by the circumstances of my nature to apprehend that particular essence; and "evidently all other essences, which I have not been led to think of, rejoice in the same sort of impalpable being."§ Though impalpable, this realm of Platonic essences is a realistic realm: it is absolute, it is infinite, it is immutable,

* *Essays in Critical Realism*, p. 182.

† *Ibid.*, p. 181.

‡ *Ibid.*, p. 183.

§ *Scepticism and Animal Faith*, p. 76.

and it is ontologically transcendent in the sense of being independent of intuition, the only sort of apprehension congruous with it.

(2) The objects of belief (the particular facts and events that make up the world of commonsense and of science) must likewise partake of a realistic ontology. This is rendered necessary by the view that "impalpable" essences are the ultimate data of immediate intuition. An object of perception differs from a datum of intuition, we should remember, in being a fact or an event *believed* to occur in a definite locus and under particular conditions and relations that are multiple and variable; it requires, therefore, an act of apprehension that, unlike intuition, is essentially assertive and selective, the validity of which may always be challenged simply because what we are indubitably certain of at each moment of attention is some essence—an ideal quality of being—which (as it is intuited) may not at all be embodied in the object believed to exist. For what alone is present to intuition is a mere essence without existence, the embodiment of it in an existence is a matter of belief, and belief "plunges us into a sea of presumption, conjecture, error and doubt."* Cognition in any form is transitive intercourse with transcendence. Intuition, which is infallible acquaintance with ideal terms, is not a species of knowledge. As Mr. Santayana epitomises it, "sure knowledge [intuition], being immediate and intransitive, is not real knowledge, while real knowledge, being transitive and adventurous, is never sure."† What is then the relation between intuition of essence and belief in existence? It may be envisaged in terms of three logical possibilities: (a) The real characters imputed by belief to an existing

* "Literal and Symbolic Knowledge," by G. Santayana, in *The Journal of Philosophy*, vol. XV, p. 432.

† *Ibid.*, p. 433.

fact may be identical with the essences as they appear to intuition. That the essences intuited actually are the characters of that thing can, of course, never be proved, but is not wholly without warrant as a practical or pragmatic assumption. (b) There may be a difference between them in a double sense: either the essences intuited are not wholly embodied in the object believed to exist (though capable of being embodied in some other appropriate thing), or the real characters of the object are but partially and remotely represented by the data of intuition. The datum taken indicatively is but a symbol, and a symbol "has a transitive function which its object, being an ultimate fact, has not; the symbol may therefore very properly or even necessarily have . . . a status and form different from those of its object."* (c) There may be a complete discrepancy between the characters of the object and the essences present to intuition: the object may be wholly wanting in the characters imputed to it or it may possess characters completely at variance with those affirmed of it by belief. These are three possible ways, logically distinct, in which intuition of essences may be related to the embodiment of it in objects of belief; and it is in terms of these ways that the distinction between veridical and non-veridical knowledge of facts can on this theory receive any clear formulation. But--and this is the important point--for these possibilities to be genuine, the existent objects---i.e., the objects *believed* to exist---must be independent of the belief that posits them. That, as they float before our flying intuitions, omnimodal and amphibious essences are embodied in existences is a colossal presumption, too colossal to rise to cognition, however hazardous, without objects actual in their own sphere capable (practically, at least), of justifying or rebuking our efforts to test it. "Knowledge is knowledge because it has compulsory objects that pre-exist."†

* *Ibid.*, p. 437.

† *Scepticism and Animal Faith*, p. 172.

Without the objects of belief enjoying a realistic mode of being, yet capable of embodying in their qualities or relations some of the essences present to intransitive intuition, there would be no way of defining the difference between one presumption and another. Fancy would have cognitive claims and natural science might be only a dream. If there is to be knowledge at all, veridical as well as non-veridical, belief and the object must "remain different in existence, origin, date, place, substance, function, and duration."* The passage from essence to existence can be justified (if justified at all) only on the supposition that existent facts, however phenomenal their status, are ontologically ulterior to the mental beliefs about them.

(3) On the basis of this analysis, what shall we say of the objects themselves in abstraction from the belief that posits them? Pure intuition does not reach them, dealing as it does with essences which *ex hypothesi* are ideal—i.e., non-existent. Belief only "posits" them: data of intuition are imputed to existences by affirmations that are "presumptive." But since intuition of ideal essences and belief in adventitious existences—inextricably interwoven in concrete human knowledge—are the only mental processes of apprehension, it follows as a consequence that the intrinsic nature of objects—i.e., in so far as they are more than what belief with the aid of its symbols instinctively or pragmatically copes with—necessarily eludes our cognitive grasp. The chasm between essence and existence is great. Belief—and all knowledge is belief—cannot bridge it. Belief, to use Mr. Santayana's expression, is a "leap," moving swiftly "from the symbol actually given in sense or in thought to some ulterior existing object."† That this leap may be a leap in the dark is a possibility which Critical Realism has had the courage not to deny. Symbols cannot lead us into the citadel of transcendent

* *Essays in Critical Realism*, p. 168.

† *Ibid.*, p. 183.

objects. Assurance of existence can be no more than practical or instinctive and description of it only conventional or symbolic. From a theoretical point of view, therefore, the inner nature of existences must be characterized as ultimately transcendent. Transcendence, with different and fluctuating meanings, is for Critical Realism an indispensable category. Essences, too, are transcendent. But the transcendence of essences concerns their mode of being only, in the sense that the realm in which essences lie is infinite and ulterior to the limited sphere of them that chance to become unrolled before intuitions. Intuition, however, when it happens to occur, determined in its existence and quality by processes underlying the class of organic facts to which it belongs, faces its essences directly. Immediate is the apprehension it affords, and absolute is the certitude it achieves. From the point of view of a particular intuition which contemplates a given essence transcendence is inapplicable to *that* essence: apprehension of it is literal. The symbolic character of knowledge confers upon the existences which are its object a transcendence in a different sense: they transcend the immediacy of intuition. Transitive belief operates by means of the data of sense and of thought (which are essences) which it instinctively takes to be signs "of a world of independent existences deployed in an existing medium."* Given essences (themselves trailing clouds of transcendence) are projected upon objects different from the mind which is "the organ of the intuition and the projection.† Such projection of essences upon existences constitutes realistic knowledge *par excellence*; but it is practical intent that, in a particular case of knowledge, dominates the relevancy of the "datum" to the "object." Knowledge of existence, therefore, is a self-transcending act,

* *Scepticism and Animal Faith*, p. 142.

† *Ibid.*, p. 151.

necessitated alike by the transcendent nature of the objects and by the symbolic nature of pragmatic belief. Of the objects themselves, therefore, in abstraction from all belief that takes the symbolic data of intuition as literal reports of them, nothing more can be said than that they are doubly transcendent: they are transcendent in the sense of being ontologically ulterior to any of the essences (themselves transcendent beings) that belief may project upon them; and they are transcendent in the sense of being independent of our never-ending cognitive efforts to grasp them, the projections of the intuited data upon them in which such efforts consist being mental events and hence utterly adventitious. In other words, the transcendence proper to the inner nature of existence is a category at once metaphysical and epistemological. Because "existents" enjoy in their own right a transcendent mode of being which "essences" may or may not adequately symbolize, cognition is destined to be mediate or representative and, therefore, liable to error and failure; and because knowledge operates by means of "essences" and can never directly come face to face with "existents," a self-transcending tendency towards the latter must be sought in the cognitive process itself to give it objective reference. Viewed metaphysically, objects are so hidden from our purview that knowledge of them must of necessity be of the symbolic or representative kind; viewed epistemologically, the definition of knowledge as belief functioning by means of non-existent essences places the intrinsic character of objects beyond our reach. Both aspects, the metaphysical and epistemological, are complementary. It is a transcendent metaphysics that begets a symbolic or representative theory of knowledge which in turn engenders a transcendent metaphysics. Upon the circular process which such a situation discloses I have commented elsewhere.*

* "The Metaphysics of Critical Realism," in *Issues and Tendencies in Contemporary Philosophy*, University of California Press, 1923, pp. 167-194.

To sum up : The recognition of essences as the ultimate data of immediate awareness implies a three-fold realism—logical, epistemological, metaphysical. (1) Essences are logical universals enjoying a realistic ontology in the sense of being independent of the intransitive intuitions whose data they are. (2) Unlike intuition, knowledge is transitive ; it is a form of belief ; its function consists in the projection of ideal essences upon existent objects ; and it is only possible when the objects to which it refers are viewed as independent of its projections. (3) This theory of knowledge, as the projection of essences upon existences, such projection being determined by the nature of the cognitive process as much as by the nature of that to which the process is directed, makes inevitable the conclusion that the intrinsic character of the objects of knowledge—the inner core of their reality—must lie in the sphere of absolute transcendence. Of this three-fold realism Critical Realism, as I view it, appears to be a novel kind of synthesis.

Such a view clearly has its difficulties. I have time only for the barest mention of some of them upon which, I trust, the subsequent discussions will be focussed. (1) There is a profound antimony between intuition and perception, or between intuition and any other form of belief. Knowledge needs intuition : in the projection of intuited essences upon independent existences consists, as we have seen, the cognitive activity *par excellence*. How is the relationship between these fundamentally opposed modes of apprehension—direct and indirect, transitive and intransitive, infallible and problematic to be envisaged ? (2) Equally profound is the antimony between essences, the data of intuition, and existences, the objects of belief. Objects of belief become such when non-existent essences are projected upon what by definition lies in a totally different realm of being. What, in the cognitive situation, is the precise contact between the non-existent and the existent, the logical and the factual, the

universal and the particular, the symbol and the ultimate fact of which it is a symbol—in short, between the datum and the object ? (3) The alleged difficulty that all realism encounters in explaining a relation of one-sided dependence appears in Critical Realism in an aggravated form. That there may be apprehension (intuitions and beliefs) at all, and that it may have this or that character, depends upon the pre-real essences and the pre-existing objects, these essences and these objects being independent of such a perusal of them. The difficulty of such a situation (if it is a difficulty) Critical Realism shares, of course, with whatever doctrine affirms one-sided dependence. Critical Realism, however, has to overcome a deeper form of it. The relation of one-sided dependence holds not only between reality and the apprehension of it—it also holds between existence and essence. The independence of essence is complete. Essence by not existing is absolutely independent of existence. But existence must depend upon essence for its characters—at least for those which belief imputes to it. Nothing given exists, declares Mr. Santayana, but whatever exists must be the embodiment of what can be given only as non-existent. How can that be ? (4) On what ground can it be asserted that essences are characteristics of things ? What Mr. McTaggart says of the probability of an inference varying “directly as the proportion of the field of observation to the field of inference,”* has some application to the relation between the infinitely possible essences and the limited sphere of them that happen for our knowledge to be embodied in existence. As the field of observation (the world of facts) is so infinitely smaller than the field of inference (the realm of essences), by what process of induction could the probability of the conclusion be established that anything has the characters imputed to it ? (5) The realm of essence and the world of things

being so infinitely disproportionate, it is difficult to see how, short of some pre-established harmony, any essences that chance to become data of intuition (which by definition are non-existent) are the very essences which are found on evidence (however slender) to be actually embodied in existing facts. How, in other words, can it be explained that of an infinite plenitude of essences equally possible of embodiment these rather than those happen to leave their impalpable realm to become identified with the nature of existing things? (6) Essences as data of intuition would seem to perform a dual and not easily reconcilable function: they separate and they connect. Data as non-existing essences separate the mind from the existent things. They appear to intervene between the mind and its objects. It is always apparent—*i.e.*, non-existing—data which the mind has immediately before it. But a veil or screen of essences is the only connecting link between transcendent objects and the mental apprehension of them. The objects must have some of the essences in their own right (and how can this be discovered?) to make possible belief about them. The basis of belief, however uncertain and hazardous, lies in the fact that essences with their identity unimpaired can inhabit two separate realms of being—the region of non-existence and the region of existence—can live, so to speak, a double life. How is that possible?

Whether difficulties such as these can be overcome by those who make a radical distinction between essence and existence I do not know. Not all of them seem to me equally formidable or insuperable. In the process of meeting them the allied and associated exponents of Critical Realism would undoubtedly part company. My own task, however, I have interpreted to consist in exposition rather than criticism. Without defending or assailing Critical Realism I have merely endeavoured to understand what, from the point of view of this doctrine (assuming it to be consistent), the separation between essence and existence

means, and how it can be reasonably restated. And I have sought also to furnish (as a basis for discussion) an answer to the question set for this Symposium. To this question—namely, whether the notion of a reality independent of mind can be rendered intelligible with the aid of the distinction between essence and existence—the answer, despite the many difficulties inherent in it, must, I think, be affirmative.



II. *By* C. D. BROAD.

1. Mr. Loewenberg has explained very fully and fairly the general position of the Critical Realists, so far as they have developed it; and I can take what he has said as an agreed starting-point. It is admitted that the Critical Realists mean by an "essence" a universal and not a particular. It is admitted that they hold that, when we are said to "perceive" an object, we are always intuiting an essence and doing something further; that intuiting and perceiving are different kinds of mental acts, of which the latter is based on the former; and that we can neither intuit a physical object or its spatio-temporal parts, nor perceive an essence. I shall take all this as an agreed basis of fact, and shall not at present question its truth; and I shall at once raise certain questions of detail with which the Critical Realists do not seem to have dealt adequately.

2. Suppose that I am looking at a straight stick which is half in air and half in water, and which therefore looks bent. what precisely is the essence that I am intuiting and what precisely am I doing with it? Am I intuiting the characteristic "straight," which I believe to belong to the stick? Or am I intuiting the characteristic "bent," which I believe that the stick seems to have? Or am I intuiting both? And does the answer to this question depend at all on the beliefs that I happen to have? Suppose, *e.g.*, that we take a grown man and a baby looking at this stick. And suppose the baby believes that the stick is bent, whilst the grown man believes that it is straight though it looks bent. Are we to say that the baby is intuiting only one essence, viz. "bent"; and that the grown man is intuiting only one

essence, viz. "straight" ? Or is the grown man intuiting two essences, viz. "straight" and "bent," and simply basing two different mental acts on his two different intuitions ? I can find no clear answers to these questions in the writings of the Critical Realists ; and yet they seem to be vitally important questions for anyone who professes to be dealing with the external world and our perception of it. On the whole the impression that I get is that they would say that the essence which I am intuiting in any case of perception is that characteristic which I, in fact, ascribe to the physical object at the time. On that interpretation the baby is intuiting the essence "bent" and that alone ; and the grown man is intuiting the essence "straight" and that alone.

The first part of this proposition seems reasonable ; the second does not. If the grown man judges, not only that the stick *is* straight, but also that it *looks* bent, there would seem to be just as good grounds for supposing that he is intuiting the essence "bent" as for supposing that he is intuiting the essence "straight." In fact the best solution would seem to be to hold that in such cases two different essences are intuited and that a different kind of judgment is based on the two intuitions, viz. "This *has* the characteristic *x*," and "This *seems to have* the characteristic *y*." In many cases both kinds of judgment may be based on the same intuited essence ; e.g., a grown man, looking at a straight stick wholly in air, might judge both "This *is* straight" and "This *looks* straight." But in many cases the two kinds of judgment are concerned with a single physical object and two different intuited essences. The man looking at the stick which is half in water may judge : "This *is* straight but looks as if it were not" and "This *looks* bent, but really is not." Let us call judgments like "This *is* straight" *perceptual judgments*, and judgments like "This *looks* straight" *phenomenal judgments*. Then what I assert is that both kinds of judgment certainly take place ; that they are certainly different ; and that, if it be reasonable to

hold that either is based on the intuition of an essence, it is reasonable to suppose that both are.

3. The next point to notice is that perceptual judgments are almost certainly more primitive than phenomenal judgments. When a certain essence is intuited under the ordinary conditions of sense-perception, the primitive tendency is to assert "This *has* the characteristic so and-so." Phenomenal judgments arise at a more reflective level, and the stimulus to their formation would seem to be the discovery of conflicts between perceptual judgments. *E.g.*, in the case of the stick half in water, the essence intuited when we first look at it would lead to the perceptual judgment: "This is bent." But we may feel it as well as look at it, and the essence intuited in consequence of feeling it would lead to the perceptual judgment "This is straight." These judgments are inconsistent with each other, and the situation is saved by substituting a phenomenal judgment for one or both of the perceptual judgments. "This looks bent" is consistent both with "This feels straight" and with "This *is* straight."

But, although phenomenal judgments first arise when we are forced by conflicts to distinguish between the characteristics which things have and those which they *only* seem to have, their application, once they have arisen, is not confined to such cases. We recognize that a thing can both have and seem to have the same characteristic; and, on reflection, we see that our only evidence for supposing that a thing *has* a certain characteristic is that it *seems* to have it under certain standard conditions.

Before leaving this matter I should like to point out the difference between "not seeming to have the characteristic *c*" and "seeming not to have the characteristic *c*." I think we say that "this thing seems not to have the characteristic *c*" when and only when it seems to have some other determinate characteristic *c'* under the same determinable *C* as that under which *c* falls. (I use Mr. Johnson's expressions "determinable" and "determinate.")

Thus we should say of the half-immersed stick, not merely that it does not seem to be straight, but also that it seems not to be straight; meaning that it seems to have a certain determinate shape other than (and therefore inconsistent with) the determinate shape called "straight." When we should merely say that "this thing does not seem to have the characteristic *c*," I think we mean that it is not at present presenting *any* determinate value of that determinable *C* under which the determinate *c* falls. When I am merely looking at a block of ice I might fairly say that it "does not seem to be cold," but not that it "seems not to be cold." It does not seem cold to mere sight, simply because the determinable "temperature" does not present itself to sight at all.

4. This last example forms a natural transition to another question which I want to raise about Critical Realism. This concerns the extreme ambiguity of the words "datum" and "given," which the Critical Realists constantly use. The one thing that I can elicit on this subject from their writings is that when I am said to "perceive" a physical object neither this object as a whole, nor any spatio-temporal part of it, is "given"; whilst the essence which I intuit and ascribe to the physical object that I am said to be perceiving is, in some sense, "given." This does not carry us very far. The one common factor which seems to be present in all senses of "given" is "not reached by conscious inference." That, however, cannot be the whole meaning of "being given." For the Critical Realists believe in the existence of certain things; deny that they reach these beliefs through a process of conscious inference; and also deny that these things are "given" to them. It is asserted by them that our beliefs in the existence and properties of chairs and tables are not reached by conscious inference; and it is denied by them that such things are "given" to us. There must therefore be some other factor or factors involved in "givenness"; and no attempt is made to

explain what they are, to see whether they are the same in all cases, or to analyse them.

I will now illustrate the extreme ambiguity of the notion of "givenness" by taking an example. Let us again consider a man seeing a stick half in water, believing that it is straight, and admitting that it looks bent. When we see a stick, or anything else, we always ascribe to it without any conscious process of inference many characteristics which are not strictly "visible" at the time or even at all. We believe it to have an inside as well as an outside, to extend in time further back than the moment at which we began to look at it, to have some temperature, some weight, some hardness, and so on. I do not pretend that we make explicit judgments about all these characteristics. But then it seems to me equally certain that we often make no explicit judgments about characteristics which we literally are seeing. I may, in some sense, "literally see" that the stick is brown, and yet not make the explicit judgment: "This stick is brown." But it is certainly true that, in whatever sense we ascribe "brownness" to a stick when we see it, we do also ascribe to it other characteristics like hardness, weight, persistence, etc., which we do not and cannot literally "see." Thus these are parts of the total essence which we ascribe to the stick when we see it. Are they "given" to us? And, if so, are they "given" in the same sense in which the colour is "given" when we see the stick? Certainly our belief in them is not reached by conscious inference. But do they answer to the rest of the Critical Realists' criterion for "being given"? I do not know, because I cannot find out what this is.

Next let us consider the shape of the stick. I am assuming that the percipient who is looking at the stick believes it to be straight but recognizes that it looks bent. Is the straightness "given" to him in the same sense in which the bentness is given; or is it "given" to him only in the sense in which hardness,

temperature, and weight are given ; or is it perhaps "given" in some third sense ? It seems plain to me that the first alternative must be rejected. It would be felt to be paradoxical to say that we "see" that the stick is hard ; though we do sometimes use such expressions as "ice *looks* cold" or "the pillow *looks* soft." It would, however, be quite in accordance with usage to say that the observer "sees" that the stick is straight. Nevertheless, most people would admit, if you pressed them, that under the given circumstances the straightness of the stick is not *literally* "seen." If any shape can be said literally to be "seen" at the time it is "bentness."

I think it is doubtful whether, in this case, the straightness which is ascribed to the stick is "given" in any different sense from that in which the temperature, hardness, etc., are "given." In so far as straightness is "given" at all at the time, it is given as a consequence of past experiences and the traces which they have left. And this is exactly how the temperature, hardness, etc., are being "given" at the time. The only relevant difference would seem to be that straightness *could be* literally seen under suitable circumstances in exactly the same sense (whatever that may be) in which bentness *actually is* being seen. Temperature, hardness, etc., *could not* be literally seen in this sense under any conceivable circumstances. But this does not seem to be an important distinction in reference to the mode of "givenness" in the case under discussion.

If we consider what actually happens when some characteristic is "given" in the way in which straightness and temperature are "given" in our example, it seems to reduce to one or a mixture of the following three alternatives : (i) There may be actual images of what it would feel like to touch the stick, to see it out of water, and so on. (ii) There might conceivably be explicit judgments, like : "This is straight," "This is heavy," and so on. (iii) Much more often there will merely be automatic adjustments of the

body in ways which *would be* reasonable if we had made such judgments. These adjustments will of course be accompanied by characteristic bodily feelings, which will form part of the sensational side of the experience.

I propose to say that the "bentness" is "sensibly given" and that the straightness, temperature, hardness, etc., are "mnemically given." But there remains one other kind of givenness to be noted. I said that, when we perceive, we always ascribe some persistence to the object which we think we are perceiving. We also assume that it has an inside as well as an outside, that it is independent of our perceiving it, and so on. These I will call "categorical characteristics." They are not like temperature, hardness, etc., which *can* be sensibly given, even if they *are not* being so given at present. They are part of what we mean by a physical object. And it seems to me plain that they are not reached by inference, but are presupposed whenever we claim to be perceiving. I shall say that they are "categorically given" in every perception. I think it likely that there are many other distinctions to be drawn under the general notion of "givenness"; but I have perhaps said enough to show how ambiguous this notion is, and how useless it is to throw it at us without analysis as if it were a kind of pass-word to the problem of external perception.

5. There remains one other question at least to be raised about "givenness." In the case of the half-immersed stick a man might only make the perceptual judgment "This is straight" and might not actually make the phenomenal judgment "This looks bent." In this particular case, no doubt, anyone *would* make the judgment "This looks bent" if his attention were called to the question, even if he *does not* actually make it. But there are other cases where a person not only does not make a certain phenomenal judgment, but also might not make it if the question were raised. Ordinary men, looking at pennies from the side, certainly do not

as a rule judge that they look elliptical, and it is often very hard to persuade them to make such a judgment. Thus the following question arises: In order that an essence may be given to us must we *actually* make a perceptual or phenomenal judgment about it and a physical object? Or is it enough that we *shall be* prepared to make such a judgment at once if the question be raised? Or is even this much not necessary? Is the essence "elliptical" given to a man who views a penny from the side even though he stoutly denies that it looks elliptical to him? I must confess that I have not the faintest idea what the Critical Realists would answer to these questions. Yet surely some treatment of them may fairly be asked from people who talk so much about "essences" and "data," and profess to be throwing new light on the problem of perception by this means. If it be said that an essence is not given unless we *actually* make a phenomenal or perceptual judgment about it and a physical object, it seems to me to follow that there are plenty of perceptions in which it is doubtful whether any essence is given to us. For I am sure that there are plenty of cases where we should be admitted to be perceiving and where it is extremely doubtful whether we are actually making any judgment at all. In many such cases it seems to me that all that we are doing is to adjust our bodies in ways which *would* be reasonable *if* we had made certain judgments about the physical object which we are said to be perceiving at the time.

6. This brings me to the last question that I wish to raise. Granted that in every perception an essence is in some sense given to us, and that we ascribe this essence as a characteristic to a certain physical object, is this an *adequate* account of perception. Granted that the Critical Realists' analysis contains nothing but the truth, does it contain the whole truth? I cannot believe that it does. On the Critical Realists' view, if I do not misunderstand it, we are acquainted with nothing but essences, and

essences are pure universals. We are therefore asked to believe that no one ever is or ever can be acquainted with anything but universals, which, for all that we *know*, may have no instances. If so, how have we arrived at the notion that there are particulars at all? Is the notion of a particular a purely *a priori* notion which we import (rightly or wrongly) into our interpretation of the universals which alone are given to us? Of course it may be so. Anything is possible. But I should certainly want a good deal of persuasion before I accepted any such theory. It does not seem to have struck the authors of *Critical Realism* that there was anything here to need explanation or defence.

We need not of course confine ourselves to this general objection. I sometimes say that I am perceiving two precisely similar red spots at once in different places. I suppose, if essences be the universals which I ascribe to physical objects in perception, that there is only one essence in this case. Why do I ascribe it to *two* objects, and judge perhaps that they are a certain distance apart from each other? On another occasion I may ascribe the same essence to a single object. The difference then cannot lie in the essence itself. I cannot conceive how such facts can be accounted for without supposing that we are acquainted with *particulars*, which stand in spatio-temporal relations to each other and which are different *instances* of the same essence. Such particulars are, of course, what I call "sensa." Thus I should say that we must distinguish (a) *sensa* and physical objects; (b) the sensible qualities and relations of *sensa*; (c) the qualities and relations which *actually belong* to physical objects; and (d) the qualities and relations which *we ascribe to* physical objects when we sense *sensa* having such and such sensible qualities and relations. Essences, in the sense in which the Critical Realists speak of them, seem to be either the sensible qualities of *sensa* or the qualities which we ascribe to physical objects on the basis of our *sensa* and their sensible qualities. It is no

doubt *necessary* to recognize essences in this sense ; though I do not think that anyone has ever failed to do so. But it is certainly not *sufficient*.

7. We were asked to say whether the notion of essence can "overcome the difficulty of affirming a Nature independent of mind." The answer is that of course it cannot ; and that the Critical Realists, to do them justice, never pretended for a moment that it could. They recognize quite clearly that, by deserting Naïve Realism, they lay themselves open to this difficulty. But they find the objections to Naïve Realism insuperable ; and, being honest men, they admit the difficulty of being certain of the existence of physical objects on their view of perception, and say "*Ich kann nicht anders.*" Here I heartily agree with them. My only quarrel with them is (*a*) that they have given a most inadequate analysis of the notions of "essence" and "datum" ; and (*b*) that, however thoroughly they might have analysed these notions, something more than universal essences must be "given" if a satisfactory account of perception is to be reached.

III. *By* C. J. SHEBBEARE.

We are asked whether the difficulty of affirming a Nature independent of Mind can be overcome by the distinction between essence and existence. But we are asked to discuss this question in relation to "Critical Realism." Therefore I have no doubt that Prof. Loewenberg and Prof. Broad have been right in giving more space to "Critical Realism" than to their answers to the special question proposed to us. In their admirably clear papers they have both spoken of the Critical Realists with what we may call discriminating praise. In this I feel sure that they are right, though I do not know that they will agree with me as to where the merits and where the defects of "Critical Realism" are to be found.

1. First for the merits. I venture to think that in one half of what Mr. Santayana has said about "essences" he has done very good service to philosophy indeed. The well-known passage in which Aristotle (*Met.* 987 a, b) recounts how it was in attending to "universals" that Plato found refuge from the Heraclitean doctrine of the flux--or rather from the general distrust of knowledge to which that doctrine might seem to lead--recalls, surely, one of the most important steps (though of course it is *only* a step) in the whole history of philosophy. The "sensible thing" is in flux as Heraclitus taught and as Plato continued to think. The red rose fades: but "redness"--the idea, the form, the universal, the essence (*τι ὅτι*) (and not only redness in general, but this shade of redness)--is not subject to such change (988 a). And if someone raises the question, "But what, after all, is redness apart from someone's perceiving it or fancying it?" the answer seems

to become clear (at least in part) when you turn to those universals which lend themselves to fuller scientific treatment, *e.g.* the "essence of a right-angled triangle" which, as Mr. Santayana says, "involves the Pythagorean proposition" (*Essays in Critical Realism*, p. 182). Allow to geometry any kind of truth or correctness at all—even the *minimum* amount of truth which the most sceptical will concede to it—and you must admit that this truth is *discovered* not *invented*. Something follows from, or is involved in, the essence or universal quality "triangularity"; and thus we are justified in using a phrase like Prof. Loewenberg's and speaking of the "essences" as "ontologically prior" to our apprehension of them. If the truth of the 47th proposition is prior to our knowledge of it, so *a fortiori* the essence "triangularity" (on which the proposition depends) is prior to our knowledge too. When we are acquainted with an essence we are (in Mr. Santayana's words) acquainted with something "whose whole reality is independent of our perusal of it." "The sort of being that essences have is indefeasible," "inalienable," "intrinsic," "essential," "dependent on nothing else, least of all, of course, on knowledge" (pp. 181-2).

That certain difficult questions can be asked at this point must be allowed. That these essences are not *unrelated* to knowledge should go without saying—if they are *different* from knowledge, and *independent* of knowledge, "difference" and "independence" are themselves relations. Thus those who are going to defend Mr. Santayana's doctrine of "essences independent of knowledge," must make good the claim that "relation" does not necessarily involve "dependence"—that one thing may be related to another without thereby being proved dependent on it either for its meaning or its existence. That this claim can be maintained I believe, but not without our becoming "enmeshed," as Prof. Loewenberg felicitously phrases it, "in a net of polemical themes." His phrase "one-sided dependence" is useful in this

connexion. There is obviously no such thing as a "one-sided relation."

Again, a question arises when Mr. Santayana speaks of the essence as "inert." We all know Lotze's phrase "the imperturbable repose and clearness of the world of ideas."* That "ideas" do not change as *things* change—that they have a permanence which things have not—seems to me quite compatible with the Hegelian view that there is movement of a kind—transition, change, even the vigorous sort of movement expressed by a word like *umschlagen*† (I have heard that the Germans use *Umschlagekragen* for a "turn-down collar," i.e. a collar which begins, as collars should, by going upwards, and then suddenly takes into its head to reverse its direction: and this comparison seems to give the exact force of Hegel's metaphor) - I say that the imperturbableness of ideas in one sense is compatible with the Hegelian view that there is violent movement in another sense, even in "the realm of shades, the world of simple essentialities (*Wesenheiten*)" with which, according to Hegel,‡ logic deals. Still, we must be careful how we express ourselves.

Again for Mr. Santayana "essences" are "luminous" and "self-evident." Some essences—e.g. "extension in space" or again "materiality"—have given philosophers a good deal of trouble, not because of the difficulty of "projecting them upon objects" but because of what looks like inherent contradiction in their meaning. But still these universals have a *prima facie* meaning which is luminous enough; and it is just from the apparent clearness of them as we first meet them in our thought that the subsequent philosophic difficulties arise. We deduce

* *Metaphysic*, opening section.

† Hegel, *Werke III*, 99.

‡ Das System der Logik ist das Reich der Schatten, die Welt der einfachen Wesenheiten, von aller sinnlichen Concretion befreit. *Werke III*, p. 44.

difficult and paradoxical conclusions from what common sense admits about what matter or space mean.

Thus, even if there is an occasional laxity of expression in what is said about these "essences," it is surely a very valuable work that Mr. Santayana and others (of his own and allied schools) have done in calling our attention to a more than half-forgotten truth: to the fact that among our objects of knowledge (in the wider sense) are objects which are "not physical, nor mental," which are independent of the state of mind that knows them, and independent of the objects we know by them, in the sense that "it makes no difference to their intrinsic being whether or not they happen to be embodied in some existing fact." I say "among objects of our knowledge" because though Mr. Santayana tries to maintain that "intuition"—i.e., knowledge of universal qualities of being—is *not* knowledge, he does not stick to this use of language consistently. To say (as Mr. Santayana tries to do) that we only *know* in the strict sense the things we are not sure of is one of those paradoxes that must take its revenge on us sooner or later. It cannot be a good use of language to say that we do not *know* what we admit to be luminous and self-evident (*cfr.* passages quoted by Prof. Loewenberg).

If, then, we know these self-evident essences—if we know what "redness" or "triangularity" are*—what exactly is it that we know in knowing them? I can imagine different answers given, and various awkward questions asked. "We know"—it might be said—"a truth about what *might* be perceived, or fancied, or thought." Or "We know a truth about what *might be* (though we don't know that it actually is)." But the part of our answer which seems to me clearest, and most relevant to our

* Prof. Loewenberg's phrase, "It is impossible to predicate of any existing thing any term that upon analysis would not turn out to be an essence," seems to be a just interpretation of "Critical Realism," and justifies us in using in this discussion any predicates that serve our purpose.

present discussion, is that in knowing what Mr. Santayana calls "essences" we are knowing something which is independent of the act of knowledge. We know certain things which are "involved"—to use his phrase—in triangularity. We know that if a really correct triangle *could* be drawn, its interior angles would be equal to two right angles: that if there *were* any red and green patches these must be different from one another. Even if we prefer to use subjective terms, we must say that what we know in knowing these essences is what "*must* be thought if thought is to be consistent": and this is prior to and independent of what *is* thought by any actual mind, divine or human.

2. But is it correct to identify these "essences" with the "datum of immediate awareness," the datum of intuition? Terminology in modern philosophy is somewhat free. For Croce "intuitive knowledge" is sharply contrasted with "logical knowledge." The former is *conoscenza dell' individuale*, the latter *conoscenza dell' universale* (*Estetica*, p. 3). For Mr. Santayana, intuition is of the universal only. But perhaps it does not much matter how we use terms as long as we are all perfectly clear what we mean by them. Therefore the important question here is whether any true and intelligible sense can be given to the assertion that our *immediate* knowledge is of universals only. Is it true that these "universals"—these "ideal characters defined by instant apprehension"—are the only things of which we are immediately conscious? By "datum," says Mr. Strong—in the volume that has given rise to this discussion*—I mean "what we are immediately conscious of."

This whole conception of the "given" or the "immediate datum" is, as Prof. Broad points out, extremely ambiguous and difficult. If we say that something "is given" we may mean that "it is not reached by conscious inference." But he argues

* *Essays in Critical Realism*, p. 223.

that this is not *all* that the Critical Realists mean to express in this term, though as to the rest of their meaning they leave us in the dark. Prof. Broad says that we "ascribe" to the stick which we see many characters which are not strictly visible; and do this "without any conscious process of inference." And surely it is true that the stick "presents itself to me" as *solid* and *moist* and *real*. It "looks" solid, moist and real. To say that I "irresistibly *believe*" the "characters" which I "intuitively apprehend" to be the "characters of an existent object" is to go too far. If the Critical Realist irresistibly *believed* that these characters were characters of an existent object, he could not immediately turn round and ask, "Is there such an object: and does it possess the characters which I attribute to it"? Still the phrase "believe" is only a slight exaggeration. For three quarters of his waking life even the idealist "believes" in solid objects: and just as I continue to *see* the stick *bent* in the pool long after I *know* that it is *straight*, so colour and shape and the rest of the essences will "irresistibly" *appear* to me as the "characters of existing objects" even though as a Critical Realist I may have had the "courage" to admit that all belief in existence may be but a "leap in the dark." If, then, I *see* my stick as solid and real--if this appearance is the starting-point of my reflection and is not abolished *as* an appearance even if criticism leads me to doubt its correctness--this appearance, surely, must be called "given" and "immediate" if we are to use those technical terms at all. Whatever history may lie behind it, it is, for me as a conscious being, a starting-point. But, if so, I cannot see how it can be right to say that the "original datum of perception"* is a "universal," or that our immediate

* In his *Scientific Thought*, pp. 72, 77, Prof. Broad speaks of the "kind of reality and independence which *universals* possess." This is a much clearer phrase, surely, than to call essences "entities of the type belonging to *logic*." Logic has a very wide range. In spite of Croce's dictum it treats of the individual.

apprehension is of universals only. Certainly universals are the "terms used in perception." But it does not follow that essences are "given *before* things can be perceived." Do I ever perceive colour—or have any immediate apprehension of colour—apart from the seeing of a coloured object? The object may be imaginary. I may see stars because I am struck. But surely what I see is *a* star, or several stars, not mere yellowness and evanescence and brightness. Doubtless I am *surer* of the "inalienable character of bentness" than that the stick I see is really bent; of the meaning of reality than that the material world is real. But that does not prove that the mind is in immediate contact with universals only. In knowing my own present pain I know not only *what* pain *is* but that a particular pain exists.

3. Does not Critical Realism, again, make a dangerous use of the word "transcendent"? A satisfactory theory of knowledge must represent knowledge, first, as knowing things as they *are*—for to believe them to be as they are *not* is not knowledge; and, secondly, must recognize that we know certain truths to be independent of our knowledge. Some arguments that one hears seem to imply that a truth is either "beyond" our knowledge and therefore unknowable, or "not beyond" our knowledge and therefore identical with knowledge or thought itself. Does not this argument use the word "beyond" in two different senses? The truth may be "within" my knowledge in the sense that I know it, and yet "beyond" my knowledge in the sense that it would be truth even if I did not know it.* Can anything that is real, then, be intrinsically unknowable? It may *per accidens* be unknowable by *me* as colour is unknowable to the colour-blind. But if it is real it must have some definite type of reality. It must at every point be describable under some universal "essence," and with such essences thought is conversant.

* Cf. *Essays in Critical Realism*, p. 24.

Again, does it throw light on knowledge to speak of "projecting ideal essences upon existent objects"? If I know that there is a bad hotel in Reading, you may say that I am projecting the essence of ill-cookedness upon the dinner, and the essence of tardiness upon the waiting. But this would mean nothing if you did not know quite well already what is meant by an ill-cooked dinner. To know that luminous ideal essence "ill-cooked" is to know what an ill-cooked meal would be. Prof. Loewenberg asks what is the "precise contact" in the "cognitive situation" between the universal and the particular. Why should it be assumed that knowledge ought to be able to be explained in terms of "contact"? If I know what an ill-cooked dinner means—and if I do not, I do not know the luminous essence—I know also the type of "contact" implied.

4. These questions should lead up to some answer to the problem set us in this symposium. It is only so far as Critical Realism is *right*, I suppose, that it can overcome any difficulty whatever.

What, then, is the difficulty of affirming a Nature independent of Mind? I gather that Prof. Broad takes the question to refer to the difficulty of being *sure* that there is a Nature independent of mind: Can we *confidently* affirm such a Nature? Dr. Loewenberg, on the other hand (if I understand him), is rather concerned with the question, "Is there anything *contradictory* in saying that Nature may exist independent of Mind?"

Now, surely, in a sense, we *are* more sure of the nature of straightness—of the meaning of a straight stick—than we are that any straight stick exists. I am more certain, in a sense, what a society of human beings means than I am of the existence of any conscious life except my own present and immediate experiences. These hold their own against the extremest Cartesian doubt. On the other hand, I should normally say that I am *quite* sure (at least, quite sure enough for practical

purposes) that the men I talk to are not phantoms : that scientific and common beliefs are in a general way correct, even if I prefer to say that what I am sure of is not a real material world but that there are certain necessary connexions binding together the volitions and other experiences of conscious beings.

It is on the other question, "Is a Nature independent of Mind a contradiction in terms?" that the Critical Realists seem to me to give more help. Take some familiar arguments. "Nature," it is said, "implies relations; but relations are mental: they can exist only in or for mind. Therefore a Nature independent of Mind is a contradiction in terms."* This argument is forcibly stated in T. H. Green's *Prolegomena to Ethics* - an old-fashioned book now but one that has wielded a great influence. "The unchanging order," says Green, "is an order of relations; and even if relations of any kind could be independent of consciousness, certainly those that form the content of knowledge are not so. As known they exist only for consciousness, and if in themselves they were external to it, we shall try in vain to conceive any process by which they could find their way from without to within it. They are relations of facts, which require a consciousness alike to present them as facts and to unite them in relation."† This conception of "without" and "within" I have touched on above. I ask now, "Are relations unmeaning apart from consciousness?" Surely if we recognize that the "essences" which we apprehend are independent of our apprehension of them - that when anyone sees (say) that if a triangle is equilateral it is also equiangular, he sees this as a truth which is not dependent upon his seeing it - we must recognize this relation between equilaterality and equiangularity as something neither material nor mental—as something that would have been true even if no

† *Essays on Critical Realism*, p. 212.

* *Prolegomena to Ethics*, p. 75.

consciousness had ever existed to unite these two terms in this relation. To say the least, Green's argument will need to be stated in a new way. It is not enough to say, "Nature implies relations: relations imply a conscious being: therefore there can be no Nature independent of mind."

Similarly when—to come to modern times—Prof. Wildon Carr uses the words, "All form is given by mind and is an active process of mind, and without form there is no reality."* even those who whole-heartedly agree that "the formless is not something, but a vain attempt to conceive the inconceivable," may still suggest that the argument, "No reality without form: no form without mind," needs to be reconsidered in light of one of the contentions which comes to the front in Critical Realism, viz., the contention that universals and their relation to one another are independent of anybody's apprehension of them.

May we answer, then, that the *distinction* (for we ought not to talk of "separation" or "final divorce") of essence from existence, and the recognition that essences are prior to our apprehension of them, would, if made good, supply an answer to some of the most impressive idealistic arguments? To make my meaning clear, I should like to say that the refutation of these idealistic argument would not make me into a realist naïve, new, neo, or critical. My chief difficulty is not in accepting (as such) a Nature independent of mind—if there are truths independent of knowledge, may there not be *real things* independent of knowledge?—but in believing in *Matter* and in the Space and Time in which it dwells. Space (so far as I can see) cannot escape contradictory predicates. It must be thought of as a *quantum* and as *not* a *quantum*—as having size and yet no size in particular (since any definite answer to the question, "How large is Space?" must be wrong). I speak with deference in the presence of anyone who

* *Philosophy of Croce*, p. 11.

finds Cantor easy reading. But at present I am not convinced that he has (as Mr. Russell thinks)* refuted all the arguments for "regarding Space and Time as unreal." And again, these do not seem to me to be the only arguments against the reality of matter, even if you cut away arguments like those of Green. But, even for those who cannot be realists, it is important to be very critical of idealistic arguments: and here, I think, we get help from the Critical Realists. Their teaching suggests that to reject matter *simply because* it is conceived as independent of mind is an error.

Thus there is one sentence of Prof. Broad's with which I cannot agree. After talking of "essences, in the sense in which Critical Realists speak of them," he says, "I do not think that anyone has ever failed to recognize essences in this sense." What the Critical Realists teach on this subject, he says in effect, we all knew before. This view surprises me. According to Prof. Loewenberg, "this realm of Platonic essences is a realistic realm . . . immutable . . . ontologically transcendent in the sense of being independent of intuition, the only sort of apprehension congruous with it." "Immutable" is, of course, a temporal phrase which may easily lead to misconception. But to say that essences are "independent of apprehension" --that the quality "redness" or "triangularity" is an *object* of apprehension but not *dependent* on apprehension, so that to know the qualities is to know truths† which hold good in their own right in the sense that they do not become truths by being known --this seems to be a clear statement: and though perhaps it *ought* to be a commonplace to all but professed conceptualists, it surely is *not* a commonplace just now. ‡ Indeed a good many difficulties

* *Problems of Philosophy*, p. 229.

† *E.g.*, geometrical truths.

‡ Nor was the priority of necessary truths to reality a commonplace in the days of our youth. See Lotze, *Metaph.* E. tr. Vol. I (2nd ed.), p. 207.

can be raised for its defenders. Thus I suggest that Prof. Broad underrates both the importance of the Critical Realists and their courage. Many views of the world have the same defect as comes to light conspicuously in popular materialism (which wants us to rest in unexplained pieces of matter) and in popular theism (which wants us to rest in an unexplained Mind). For such doctrines the elephant rests on the tortoise; the tortoise on heaven knows what. The only refuge from this lack of finality—the only hope of finding foundations which cannot be shaken—seems to me to lie in the recognition of the independence and self-dependence of “essences,” “forms,” “universal terms,” “ideas”—call them what you will; and it is something to have taken the first step on this road, even if, as I think the Critical Realists do, one puts impediments in the way of any further steps.* But in this whole line of criticism I must imitate the delightful modesty of Prof. Broad (in his recent work, *Scientific Thought*) and say, “I can hardly hope that what I have been saying will satisfy most of my hearers.”†

5. The first aim, however, of discussions such as the present is—I suppose—to agree, if we can, on the questions we should ask rather than on the answers we should give to them. Among the many questions that arise a very important group are connected with the phrase “veil or screen of essences,” which are conceived as “the only connecting link between transcendent objects and the mental apprehension of them.” Why are we tempted to speak of veils or screens or of the “three terms” involved in perception? First, we all admit that some appearances though vivid are false. If the star I seem to see as in the heavens to-night is really the star of some years ago, this appearance is in a sense a veil between me and reality. My eyes tell me

* *E.g.*, recognition of the importance of the conception suggested in the phrase αἴτια τὰ εἶδη τοῖς ἄλλοις, *Met.*, 987 b.

† *Scientific Thought*, p. 84.

categorically that the partly immersed stick is bent. But are the *essences* a veil? We know them; we also know something about things by means of them. If I know what "straightness" means, I know something of what a straight stick would *be*. And—unless all our supposed knowledge is illusion (which no one really thinks)—we also know, by means of essences, some truth about actual reality; and so far as we *know* reality the veil between us and it is removed. Even in the case of mediate inferential knowledge the mind reaches to its object. Mediation seems to bring immediate contact. It is a well-known saying that "there is nothing in heaven or earth, in Nature, in Mind, or anywhere else, that does not contain immediacy just as much as mediation." * This old saw, perhaps, is worth our remembrance to-day.

At any rate, surely, it cannot be right to deny that essences involve abstraction. I am *surer* of what straightness means, than that there are any really straight sticks. In perception straightness and the straight stick come to me together. But straightness, none the less, is *thought*, not literally seen,† and Thought in knowing it goes through what, by metaphor, we call abstraction. We begin with the vision of a straight stick. Is it wrong to say that the particular stick seen is "given"? We start from it, even if we decide it is illusion. I do not know that there is any harm in saying that the universal is "given" too; "given before things can be clearly‡ perceived"—as Mr. Santayana says—so long as we recognize that it is Thought which sees the universal in the particular. Is it inconsistent to say that the universals are prior in one sense (the terms

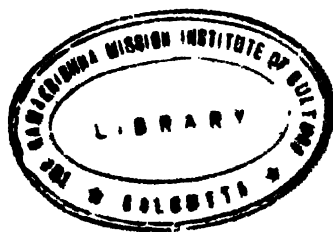
* Hegel, *Werke III*, 56.

† This is especially clear with generic "essences" covering many species. I *see* or *picture* a particular shade. I *think* "redness" or "colour"

‡ We might add "or even confusedly."

used in perception); posterior in another (the results, for us, of abstraction); elements in a single process which affirms both the particular and the universal?

I am well aware of questions lying right in my line of march—notably one of Prof. Broad's—which I have left unanswered. But I hope I have raised some questions which properly arise when we discuss the “cognitive situation”—when we ask, as in effect we are asking, “What are the conditions which a theory of knowledge can reasonably be expected to fulfil”? We can at least ask that it should not make anything darker which was dark enough before.



V

FIFTH SESSION. *July 13th, 1924, at 10 a.m.*

Chairman: DR. J. S. HALDANE.

V.—SYMPOSIUM: THE RELATION BETWEEN THE PHYSICAL NEXUS AND THE PSYCHICAL NEXUS OF SUCCESSIVE GENERATIONS.

By JAMES JOHNSTONE, ARTHUR DENDY, E. W. MACBRIDE AND
C. LLOYD MORGAN.

I. *By* JAMES JOHNSTONE.

DOES THE DEMONSTRATION OF PHYSICAL CONTINUITY IN THE GERM-PLASMS OF SUCCESSIVE GENERATIONS OF ANIMAL ORGANISMS ALSO DEMONSTRATE THE TRANSMISSION OF MENTAL CHARACTERS ?

BIOLOGISTS have generally set up a contrast between physical and psychical characters: it is impossible, said Karl Pearson, to deny the inheritance of mental characters—that was proved by the work of Francis Galton, if by nothing else. Let us then go further, he said, find exact, quantitative measures of the inheritance of such characters and proceed to compare them with similar values obtained for the degrees of inheritance of physical characters. For instance, we see that certain morphological characteristics, say, the shape of the head, are inherited and a measure of the inheritance can be obtained by establishing correlations between brother and brother, sister and sister, or brother and sister. So also intelligence, as indicated by the places taken

in school examinations, can be measured in the same boys and girls and then similar correlations between siblings can be set up. Thus we find that there is a parallelism between the contrasted mental and physical characters, in that the correlation coefficients are practically the same.

Later research goes further than this in insisting on the interdependence of physical and mental characters: "A man's body has a profound influence on his mind"; "certain physical disorders are attended by certain psychical states"; "the provision of spectacles, the extraction of teeth, the extirpation of tonsils and adenoid growths, measures in themselves comparatively trifling, have often converted an alleged mental defective into a normal or nearly normal child."* These and similar experiences show that there is more than a merely statistical functionality between morphological and mental activities; there is an actual dependence of psychical state upon some particular organic functions. This must be taken as really demonstrated. Yet, in all that is said so far, we still think about a dualism of mind and body, and we see the same kind of variability and the same manner of inheritance in respect of the two series of variables.

Now, of late years, what Dr. Louis Berman calls a shaft of light, illuminating the darkest places in human nature, enables us to see still further into this problem. What we call temperament, character and personality have been shown to be associated in a high degree with the activity of the endocrine glands. Normal, balanced or neutral temperament depends on the normal, balanced, secretory activity of the thyroid, pituitary, thymus, adrenal and sexual glands. Usually high activity of one or other of these organs, relative to depressed activity of the others, tends

* The quotations are from Dr. Cyril Burt's address to Section J of the British Association Meeting of 1923.

to some one-sided emotional or intellectual development. When the ante-pituitary, thyroid, adrenal and sex gland secretions are balanced we have brain workers of more than average output; thyroid-centred individuals are energetic, memorise well, think rapidly and are "percept-dominant"; pituitary-centred examples preserve memories well and are "concept-dominant"; ante-pituitary-centred men are able to develop into scientists and philosophers; ante-pituitary types exhibit feminine mental traits; post-pituitary types are masculine; and so on. Admit that much modern work on the ductless glands cannot yet be built up into a system and that speculation may have outrun the physiological results, nevertheless a great body of facts point clearly to the conclusion that character, personality and great mental ability are functions of the relative abundance of certain glandular activities. What we may loosely call the finer human psychical qualities: those that we feel when we compare men and women; those others associated with creative artistic work of any kind and all that we connote by such terms as intuition and sympathy (used in the ordinary ways) seem to be not "mental" at all but are rather qualities that are exhibited when unusual secretory activity in certain rather small glandular organs occurs. Fantastic as this conclusion may appear to anyone who is not conversant with modern physiological research, it is nevertheless one that is almost established.

Those other psychical characters which I venture to call the more resolute ones seem to be no less associated with bodily functioning—I suggest that they are, indeed, bodily functioning. For the moment I become a Neo-Kantian and think about mentality as the expression of the activity of certain mental "operators." These work up the data given by sensation and in their functioning we become conscious of the quantity, the quality and the relations of events. It would not be impossible, I think, to show that in simple cases reasoning is a bodily activity. A

row of equally spaced round spots, for instance, is similar in quantity to another row of equally spaced square spots but different in quality. Long and short rows of equally spaced round spots may be similar in quality but different in quantity, while the same numbers of equally shaped spots may be differently arranged and so present us with the notion of relation. There is no difficulty in explaining all this as simply the result of consciousness of the movements of the muscles of the eyes which have moved round the peripheries of the spots and traversed the spaces between them. These judgments are obviously the intuition of the sums of muscular efforts. The example may seem to be a rather simple one, the method biologically naïve and the conclusion perhaps facile, yet I do not doubt that similar lines of investigation would lead us to similar conclusions in the case of much more elaborate mental efforts. Obviously I follow Bergson here and regard all reasoning processes as virtual bodily activities. We set the points, so to speak, even though we do not run the trains over them.

Evidently, then, I contend against the dualism that has been noted above. I argue that what we usually call "mental characters" are really bodily activities. They must, then, be variable and be transmitted and inherited just as we clearly see that morphological characters vary and are transmissible and inheritable. It is no more surprising that there should be a correlation between the shape of the head and the ability to pass an examination than that the relative length of the right arm should be correlated with that of the left one. Mentality, on the other hand, I regard as indistinguishable from life itself; as something invariable and unique in an evolutionary career. Personality, "mental" quality and temperament are, it seems to me, essentially individual phenomena.

Now I examine the biological conception of the individual. The organism in the ordinary sense begins in an ovum, which is

a minute fragment of living substance detached from another (parental) organism. The ovum grows and develops to form an individual organism, but clearly the mass of the latter is not derived from the ovum but from an environment. This environment (which I shall call the somatic one) may be sea water (in the case of a sea-urchin egg); the albumen and yolk of a hen's egg or the blood in the case of a pregnant mammal. Nowadays we are forced back to the old notion of preformation in development—that is, the form of the individual is determined by an assemblage of *factors* in the ovum. These factors operate in some way *via* an assemblage of morphological entities—the chromosomes and their parts. They select certain materials from the somatic environment and assemble these to form the tissues and organs of the body or soma. Throughout its life-career the soma dissipates its parts into the environment in the bodily excretions, and, on its death, this dissipation becomes a catastrophic one. The soma, then, is an individual constellation of molecules assembled by the developmental entity contained in the ovum. As such a constellation it has a beginning and an end. The sum of its activities is the individual life-career.

Even if the preformed assemblage of factors in the ovum were invariable from generation to generation, we should still expect the individuals to vary with respect to each other. The instinct of nest-building in a particular species of bird we may expect to be the same, yet the nest built by the same bird is never quite the same structure: the materials are taken and assembled from an environment which is inconstant. The somatic environment of the developing ovum, embryo, foetus or larva also varies, and so we expect to find variability in the resulting soma. This “fluctuating variability” shows no bias, and there is a normal mean or typical structure from which the individual somas vary. The factorial assemblage in the chromatoplasm of the ovum we regard, for the moment, as invariable, and so these individually

fluctuating variations are not transmitted. There is, indeed, no transmission from individual body to individual body. What we do actually see is an unique, continuous, germinal material which forms individual bodies at certain intervals of time. This is "heredity."

Now turn from these discontinuous individual life-careers to the continuous racial one. The factors of development are obviously *not* the visible chromatoplasmic substances which we find in the nucleus of the ovum (or spermatozoon). This material increases in mass enormously in each individual career; thus a very few germ-cells, at the most, are contained in the embryonic body of a male herring, but during each reproductive season very many millions of germ-cells are formed and are emitted into the sea. It is extraordinarily difficult to think of any complex mechanism (in the ordinary sense of the term) capable of being subdivided to this extent, especially when that mechanism is so minute as a microscopic granule in the nuclear chromatic substance. The factorial mechanism we seem obliged to regard as something intensive and not extended in space and as capable of subdivision while yet remaining the same in its nature. This factorial assemblage I simply call the "germ," distinguishing most carefully between it and the visible "germ-plasm." The germ must therefore select materials from *its* environment and then assemble these to form the visible germ-plasm. The germinal environment is (immediately) the cell bodies in which we may think of the germ as being "contained," and these cell bodies are environed by the somatic fluids just as the soma itself is environed by the external inorganic world. Now the soma, being assembled from an inorganic environment that is not invariable (which, indeed, undergoes phasical change), must vary in structure as between individual and individual. (Yet individual organisms are astonishingly like to each other, and we note with interest how very assiduously the organism living in the wild

endeavours to remain within physical conditions that differ as little as possible. This attempt to *choose* a uniform environment gives us the key to the understanding of a multitude of facts in natural history migrations, for instance, and the failure to keep within an uniform environment gives us the further key to the study of organic adaptations and leads us directly to an appreciation of what is meant by transformism with regard to organic species.)

A variable soma means, therefore, a variable germinal environment. So the germ-plasm—that is, a developmental material mechanism extended in space—must vary because it is constructed from material selected and assembled by the germ from a variable environment. Thus we account for germinal, or congenital, variations the effect of which is to lead to a rather different somatic constellation or individual organism. (Yet, again, we note that the soma tends to remain more uniform than its inorganic environment, and so the germ tends also to select and assemble the material of the germ-plasm in the same ways, even though the germinal environment is necessarily somewhat variable. So we find actually that the germ-plasm is extraordinarily resistant to changes in the body that environs it, though it is now fairly evident that it *is* affected by somatic changes.)

The distinction, in the biological sense, between the individual and racial life-careers will now be plain. The individuals are the material, specific constellations that are selected and assembled from the inorganic environment by a mechanism, the germ-plasm. They are discontinuous in space and are represented in nature by a multitude of examples—the organisms of the species. They are discontinuous in time just as successive drops of water falling from a leaking tap are discontinuous. Each of them, in virtue of the formative material represented in its somatic cells by chromatoplasm that has been built up from the germ-plasm, continues to select material from its environment and to assemble

this into specific substances that renew the wasted tissues and afford it energy—this is its process of nutrition. The series of interactions between the individual organism and its environment we call its behaviour—its physical and mental characters, or qualities. Its uniqueness is a statistical effect ; it selects materials from an environment that varies, and though it has a criterion, so to speak, of the value of these materials, it is unable ever to obtain them in precisely the same order or quality. The criterion is what we call heredity, and the deviations imposed upon the activity of the formative germ-plasm by the inconstant environment we call the fluctuating variability of the individuals.

The racial career is unique. There is literal immortality of the germ, absolute continuity in time. The germ that is in each of us has always been in a sense that is not true with regard to the soma, which is assembled and then dissipated. The germ is not assembled, nor is it disassembled when it is divided during the processes of reproduction. It is not really a nexus between the generations of individuals, for the latter are incidents, so to speak, in its career in time. We call it the nexus between the individuals only because it is the latter that have interest for us. It is not mechanism in the ordinary sense ; it is simply life. It is invariable because the fluctuating or cumulative variability that is apparent in the individuals are in the environment.

Its expression in nature—that is, the existence of organic individuals assembled from the materials of the environment—is what Bergson calls the insistent effort of life to insinuate itself into matter that is becoming inert—the tendency to resist that growth of inertia in the organic world. In this effort are displayed those qualities that we call physical and psychical—qualities that we can only describe in terms that have reference to the material environment into which life insinuates itself.

II. *By* ARTHUR DENDY.

WHAT IS MEANT BY THE INHERITANCE OF MENTAL CHARACTERS ?

THE chief difficulty attendant upon such discussions as that on which we are engaged this morning seems to lie in the want of agreement as to the meaning of the terms employed, for it is not sufficient in dealing with scientific problems to leave the meaning to be gathered from the context, as I understand is sometimes done by philosophers.

I take it for granted that the subject before us is to be approached from the biological standpoint, and that we are not concerned with the use of the term inheritance in its every-day or popular sense, in accordance with which a brother may inherit from a brother or even a father from a son. To the biologist inheritance means the repetition—apparently by transmission—of some bodily or mental character in a direct line of genetic descent. I say *apparently by transmission* advisedly, because the characters, general or particular, which are commonly said, even by the biologist, to be inherited, are not really themselves transmitted at all. Sir Archdall Reid insisted ten years ago that such a feature as a man's head, for example, is not really inherited. All that the man inherits is the power to develop a head under appropriate conditions. If he had said "not transmitted," I should have agreed with him completely, but he appears to regard the terms transmission and inheritance as being strictly synonymous, a view which seems to me to be undesirable.

Let us consider a familiar analogy. When we say that an infectious disease has been transmitted from one person to

another we do not really mean what we say. All that we mean is that certain germs have been transmitted and that these germs, having found a favourable environment in the body of the second individual, there give rise to certain effects. We should hardly think of saying that the symptoms manifested by the patient have been transmitted to him, however much they may resemble the symptoms manifested by the individual from whom he is said to have caught the disease.

Similarly, it seems to me, we must distinguish between the real transmission of something from parent to child, and the development in the child of certain characters as the result of such transmission. But this is by no means enough, for we must further guard ourselves against supposing that the something that has been transmitted to the child from the parent is the sole cause of the characters or features, or whatever we like to call them, that make their appearance in the child. Other causes must co-operate, in which the parent may be in no way concerned.

Now I take it that for the purposes of the biologist the word "inheritance" must be so defined as to include both the transmission of material factors—using the term factor for the moment in its ordinary sense—and the development of what we call inherited characters in the child, partly as a direct consequence of the presence of such material factors and partly as the result of other influences or stimuli to which the developing organism is subjected. The only possible alternative to this broad definition seems to be to restrict the use of the term inheritance in some purely arbitrary manner, in accordance with some specially chosen point of view. We might, for example, make the term "inheritance" synonymous with the term "transmission" in the sense in which I have employed the latter, but if we did we should have to give up talking about the inheritance of bodily and mental characters altogether,

for such characters are not transmitted as such ; they are not present in the child *ab initio* ; they only develop in the course of ontogeny.

The conception of heredity, then, if it is to be of any real service to us, must include the development of the individual from the fertilized egg, not only to the adult condition but up to the time when the life-cycle is completed and the individual itself ceases to exist.

It must, I think, be admitted that the entire life of any organism consists of a series of responses to stimuli which reach it from various sources. The stimulus of fertilization, probably due to some chemical substance introduced into the ovum by the spermatozoon, initiates cell-division, and other stimuli follow in due sequence throughout the whole course of events. The astonishing thing is the precision and accuracy with which this sequence of stimuli is repeated in each successive generation. Upon this precision and accuracy depends the resemblance of child to parent. Without such a sequence there could be no such thing as heredity.

The familiar example of the dependence of the lens of the eye for its development upon the immediate proximity of the optic vesicle illustrates very clearly the close correlation between the different parts of the developing organism, a correlation which is undoubtedly brought about in many cases by the action of "hormones," or chemical stimulants. These are internal sources of stimulation. The action of the secretion of the thyroid gland in bringing about the metamorphosis of the larva in amphibians is another example. But stimuli furnished by the external environment are of no less importance. The hen's egg commences its development as it passes down the oviduct, but when its temperature falls as a consequence of its leaving the warm body of the parent, development abruptly ceases and will only be resumed if and when the process of

incubation again raises the temperature to the necessary degree.

We cannot doubt that the developing organism builds itself up in a strictly ordered fashion by absorbing food material from its environment and arranging that material in accordance with the various stimuli to which it is subjected. Some of these stimuli are external, others internal in origin, and amongst the latter we must recognize the fact that there are some which have their source in the germ-cells themselves. In the case of any one of the higher animals, however, the material with which it starts life as a fertilized egg is almost infinitesimal in comparison with that which is necessary to make up the fully developed body, and we can hardly avoid concluding that the stimulation that has its source in the fertilized egg is but a fraction of the total stimulation necessary for its development, though it may be of extreme importance.

It has been abundantly proved by experiment that if the sequence of stimuli to which the developing organism is subjected be altered at any point, beyond very narrow limits, the result will be altered accordingly. The resemblance of the child to the parent—in other words heredity—depends upon the degree to which the normality of the conditions of development is maintained, and nothing is more striking amongst the higher animals than the elaborate precautions that are taken to secure such normality. The womb of the female mammal is a self-regulating incubator and feeding apparatus of the most delicate and complex kind, and it is inconceivable that the development of the mammalian egg could take place outside the body of the parent.

For these reasons we must not concern ourselves seriously with the nightmare of "ectogenesis," which appears to Mr. J. B. S. Haldane "to be neither impossible nor improbable" (*Daedalus or Science and the Future*. Kegan Paul 1924). It may

be possible to keep rabbit embryos alive for a few days in a suitable nutrient fluid, just as it is possible to keep isolated fragments of tissues alive almost indefinitely under similar conditions, but to enable a fertilized mammalian ovum to develop into a complete individual of the same kind apart from a natural mother it would be necessary to supply it with an artificial mother hardly distinguishable from the true parent. The blood-vascular system, for example, upon which the nutrition of the embryo depends from a very early stage, could not develop except under the complex stimulation associated with its method of nutrition and respiration, or if it did it would develop into something quite different from the normal. The most we could expect from the development of the egg in a nutrient fluid would be an almost undifferentiated mass of cells—a kind of quasi-independent tumour. Something of this sort has indeed been achieved by growing frog's eggs in the body cavity of a frog, where they may even attach themselves to some organ and become vascularized, forming a kind of parasitic growth.

We have pointed out that certain of the stimuli upon which the development of the organism depends have their origin in the germ-cells of the parents. As to the actual nature of these stimuli we know as yet practically nothing, but much has been learned during recent years both as to their effects and as to the sources from which they arise.

These sources are the so-called Mendelian factors in the chromosomes of the germ-cells. There can be no doubt that these factors—or genes—are handed on from generation to generation by a true process of transmission. They are probably to be looked upon as ultra-microscopic particles of living matter, multiplying by division and influencing the body by means of specific chemical substances, analogous to the hormones of the physiologist. They are distributed throughout the

developing body by the elaborate process of mitosis which accompanies cell-division, and exert their special influence when the proper time arrives and they find themselves in the appropriate situation.

Each one may be responsible for the appearance of some particular character, or, as I should prefer to say, some particular modification of structure or function, that comes into existence in the developing organism, but to suppose that the entire organism is made up of a number of "unit characters," each dependent upon some particular Mendelian factor, or upon some group of such factors, appears to me to be a gross exaggeration of the state of the case. There can be no doubt, however, that in modifying what, for want of a better word, we may call its normal characters, the Mendelian factors play an extremely important part in determining the fate of the organism, as where, for example, the presence or absence of a particular factor determines the presence or absence of some particular disease, such as feeble-mindedness, in human beings. In such cases the individual is literally poisoned at the very commencement of its career. At any rate a very large proportion of the effects that can be traced to the influence of Mendelian factors are structural or functional abnormalities.

Having thus endeavoured to gain some clear conception of part at least of what is implied when we talk about inheritance, we may come to closer grips with the immediate problem before us. At this point, it seems to me, another definition, that of mind, is required, but a mere biologist can hardly be expected to tackle such a formidable problem. He must content himself with looking upon mind from the purely physiological point of view, as the immediate result of the functioning of the higher centres of the brain. Whether or not mind can exist apart from the brain is a question for the metaphysician, but it is only in so far as they are related to the brain that the discussion

of the inheritance of mental characters can have any meaning from the biological point of view.

No one who has witnessed the appalling consequences of cerebral hæmorrhage, or of other injuries to the brain, or the effects of drugs, can have any doubt as to the dependence of mental characters upon brain structure and function, and this dependence is no less clearly manifested by the strict correlation between cerebral and mental development both throughout the animal kingdom and throughout the development of the individual. That the mind has undergone an evolution parallel with that of the brain there can be no question, and that it undergoes a similar evolution in ontogeny is manifest to every one who watches the mental development of the growing child as it recapitulates the successive phases of its ancestral history.

The complexity in structure and function of the human brain is such as to defy, for the present at any rate, all our efforts at complete analysis. Nevertheless much progress has been made in recent years; so much so that Professor Elliot Smith, in a recent discourse at the Royal Institution, was able to say that "the capacity for understanding the deeper significance of words and the wider meaning of the whole sentence . . . is dependent upon the complete integrity of the cortical connexions linking the tactile with the visual and acoustic areas. The functions of this parietal territory are as significant for the real understanding of events as the prefrontal territories are for the attainment of muscular skill, although in all its activities almost every part of the cortex plays its part."

The brain, like every other part of the body, builds itself up by its own responses to stimuli received from various sources, and the mind builds itself up *pari passu* with the brain. The most powerful of these stimuli are those received from the external world through the special organs of sense, and consequently we find a tripartite division of the brain into fore-

mid- and hind-brain, corresponding to the three pairs of cephalic sense-organs. Upon this, however, has been superposed, in the case of the higher vertebrates, and especially of man, that vastly complicated machinery of co-ordination and association that forms the basis of those phenomena which are commonly regarded as mental.

All these considerations go to show that there is no *a priori* reason why mental characters, closely correlated as they are with brain structure, should not be inherited in exactly the same sense as bodily characters, and indeed there is abundant evidence to show that this is the case. The *general* resemblance in mental characteristics between child and parent is as obvious as the general resemblance in the structure of the brain, and if the one can be said to be due to inheritance so also can the other. I take it, however, that in this discussion it is intended to focus attention upon *special* mental characters, more or less peculiar to individuals, such, for example, as the so-called artistic temperament, or the mathematical faculty.

In accordance with the generally accepted antithesis such special characters must be either acquired (somatogenic) or innate (blastogenic). But it is evident from what has been said before that all characters must be acquired by the individual in the course of its development in response to the various stimuli to which it is subjected. Inasmuch, however, as some of the stimuli in question have their origin in the germ cells, we may legitimately speak of their effects as blastogenic. But the term somatogenic cannot in strict logic be used antithetically to blastogenic, for the stimulus to which a somatogenic character owes its origin may arise either in the body itself or outside the body altogether. The logical antithesis, then, would appear to be between blastogenic and non-blastogenic.

But even blastogenic characters are not transmitted by heredity as such. All that is so transmitted is some material

substance in the germ-cell capable of becoming a source of stimulation, and it requires the co-operation of innumerable other stimuli, of non-germinal origin, to bring about the development of any particular character. The fact that such stimuli are normally forthcoming in no way invalidates this conclusion.

It is impossible, on an occasion such as the present, to discuss in any detail the problem of the inheritance of non-blastogenic, or so-called "acquired" characters, but I think we must recognize the fact that opinion is in many quarters veering round again to the positive or Lamarckian position. Some recent experimental work, notably that of Guyer and Smith in America and Pavloff in Russia, seems to point strongly in this direction, and the work of Guyer and Smith in particular seems to suggest a line along which some explanation of such inheritance may be forthcoming.

It will be remembered that these experimenters were able to produce well-marked heritable defects in the eyes of rabbits by injection into the veins of the pregnant mother of a lens-sensitized serum, or even of the lens-substance itself. It appears that an antibody is formed in the blood which has the power of destroying the proteids of the lens. We must suppose that, in the first instance, this antibody reaches the foetus through the placenta and directly attacks the embryonic eye. But the defects produced may be inherited for many generations, and even through the male line, and they may even become intensified in course of time.

That we have here a case of the inheritance of a character originally due to the direct action of the environment can hardly be doubted. In their latest paper on the subject* Messrs. Guyer and Smith say, "Perhaps the most interesting fact brought to

* *Journal of Experimental Zoology*, vol. 38, No. 4, January, 1924.

light in the present study is [the] possibility of directly or indirectly inducing germinal changes by means of antibodies engendered in an animal's own body against tissue taken from other individuals of its own species. Such a result, together with those obtained by the senior author (Guyer, 122A) in the production of antibodies against an individual's own spermatozoa, lend support to the idea that an animal can build antibodies against its own tissues when these are misplaced, altered, or injured in some way, and that such antibodies may induce germinal changes." They further observe, "In our opinion, however, it is not impossible, or improbable, that a foetal defect engendered in the eye or elsewhere by even general means might lead to the development of antibodies which could attack the germinal correlatives of the somatic part affected, and thereby inaugurate a specific germinal change."

The experiments of Messrs. Guyer and Smith show very clearly how a modification of bodily structure may arise in the first instance as the result of the direct action of a specific antibody. It is perhaps permissible to regard these antibodies as chemical stimulants analogous in their action to the hormones which play such an important part in regulating the behaviour of the organism. But the question now arises—Do not all bodily modifications, apart, perhaps, from mere deformations due to purely mechanical agencies, originate in some metabolic change? In other words, are they not responses to the action of some chemical stimulant? May we not suppose that a change in the environment, a lowering or raising of the temperature, for example, brings about a corresponding change in the metabolism of the organism, and that it is the altered products of metabolism that are directly responsible for the appearance of the "acquired" characteristics?

It has always been difficult, if not impossible, to understand how a change in the structure of the body could itself effect a

correlative change in the germ-cells, but it is by no means difficult to understand how the same chemical stimulant may affect both body and germ-cells concurrently. Such action has long been recognized under the name "parallel induction." In previously observed cases of parallel induction, however, there seems to have been no permanent change in the constitution of the germ-cells. The results seem to have been due to a merely temporary accumulation of some chemical stimulant which has become exhausted again in the course of a few generations, as in the case of Professor Agar's experiments on *Simocephalus*. Messrs. Guyer and Smith's experiments take us a long step further than this, by showing that the actual constitution of the germ-cells may be affected in such a manner as to bring about a perpetuation of the bodily modification originally associated with (but not the cause of) the germinal modification.

The bodily modification and the modification of the germ-cells are in the first instance different results of the same cause, but in successive generations the modification of the germ-cells becomes the cause of the appearance of the bodily modification. We can perhaps explain this by supposing that the constitution of the germ-cells is modified in such a way as to cause a further production in each generation of the same chemical stimulant that was responsible for both germinal and bodily modification in the first instance. Is such a supposition warrantable in the present state of our knowledge? I venture to think that it is at any rate not unreasonable.

Let us substitute for Messrs. Guyer and Smith's "germinal correlatives" the Mendelian conception of "factors" or "genes," lodged in the chromosomes of the germ-cells. There is good reason for believing that these must be more or less independent units composed of highly complex molecules, and capable of growth and subdivision. Let us consider briefly how this growth may be supposed to take place.

At this point I should like to refer those interested in the problem to the very suggestive discussion on the inheritance of acquired characters given by Dr. Adami in his "Medical Contributions to the Study of Evolution,"* a work in which some very convincing evidence in favour of such inheritance will be found. It is, however, Dr. Adami's suggestions as to the mode of growth of the living molecule, or "biophore," as he terms it, that seem to me most helpful at the present moment. He compares this growth to the process of crystallization, but it will be as well to quote his own words:—"Granted that the already existing biophore finds itself in a medium—the nuclear cell sap—containing the necessary radicles, should that by one of its attachments attract to itself one of its component radicles, there is then started a process by which in orderly sequence the other radicles become attached, until there is built up a compound molecule, identical with the pre-existing molecule, in association with which it has become developed. This conception—namely, that the growth of the biophore, or otherwise of the molecules of living matter, is essentially of the same nature as is that of crystals—is materially aided by the recognition that crystallization does not of necessity demand the production of rigid rectilinear figures."

Let us now imagine an antibody, or some other equally complex product of altered metabolism, reaching the germ-cells with the blood, or by diffusion through the tissues: is there any reason why it should not take up a permanent abode there and begin to grow by some such process as that suggested by Dr. Adami? Might it not thus come to form an additional factor in some chromosome, or perhaps replace some factor already existing there, and thus become part of the heritable constitution of the germ-cells themselves and a source of chemical

* London, Duckworth, 1918.

stimulation bringing about in future generations a repetition of the somatic modifications with which it was originally associated?

In the present state of our knowledge it would perhaps be unprofitable to pursue this line of argument any further. All that I am concerned here to show is that it is by no means impossible to imagine a mechanism by which the inheritance of what are commonly called acquired characters may be brought about, and that we must not allow ourselves to be biassed by any preconceived notions as to possibility or impossibility in our efforts to weigh justly the evidence for and against such inheritance.

We have, then, to conceive of a mental character as being primarily the outcome of the structure and functioning of the brain, which in turn depend upon long and complex sequences of stimuli received from various sources. The resemblance of the mind of the child to that of the parent will depend entirely upon the accuracy with which the sequence of stimuli is repeated in each successive generation. If the mental characters of an individual are modified by the action of some new stimulus the modification in question will be repeated in the next generation only if the stimulus concerned is repeated. If this stimulus was blastogenic or germinal in origin, giving rise to what is called a "mutation," it will be repeated for that very reason. If it was non-blastogenic in origin there would seem to be two possibilities. It may, of course, be repeated as a non-blastogenic stimulus, as is frequently the case; but if its action is accompanied by the formation of some specific product of altered metabolism, acting as an intermediary between the stimulus and its effect, this product may quite conceivably find its way to the germ-cells and take up its position there as an integral part of the germinal constitution. If the non-blastogenic stimulus in question is repeated from generation to generation,

we may suppose that a corresponding re-inforcement of the germinal modification will take place, so that even if this is not strong enough in the first instance to bring about any recognizable effect upon the next generation it may do so after a sufficient number of generations have elapsed.

That the process of converting a non-blastogenic into a blastogenic modification is usually a very slow one there can be little doubt. That such conversion actually takes place appears to be demonstrated, not only by recent experimental work but by a great deal of indirect evidence which it is impossible even to summarize on the present occasion.

III. *By* E. W. MACBRIDE.

THE question which I am called on to discuss this morning is this: granted that our bodily characters are inherited from our parents are our mental qualities also so inherited? Now the first point which is raised by this question is the further question, "What are mental characters?" Do we merely mean mental tendencies such as impulsiveness, caution, fickleness or perseverance, or are all the qualities of the "Psyche" included? Do we not all of us experience the fact that the unanalysable, subject or ego, can stand apart, separate itself from its own tendencies, recognize them as something extraneous to itself and actually sit in judgment on them? I associate myself entirely with Ward and McDougall in denying utterly that any physical explanation of the ego has been made or can be made, and in holding that the dualism of mind and body is the most fundamental thing in all the Universe seeing that it is presupposed in all experience. I am, however, prepared to offer evidence which seems to me absolutely convincing that the tendency or "proclivity," as the Americans call it, to acquire habits of mind or body is passed on from parent to child. As to how it is passed on I am a complete agnostic. We may say, if we like, that it accompanies or is associated with the physical germ which, detached from the body of the parent forms, the foundation of the body of the child, but to state this fact is not to throw any new light on the question.

I find myself in fundamental disagreement with most of what Prof. Johnstone has said, and though I am a great deal nearer accord with Prof. Dendy, I disagree with him also in many points.

Both Prof. Johnstone and Prof. Dendy emphasize the distinction between germ-cells and body. It is according to them the germ-cells which are immortal, the "soma" is a temporary constellation of parts, which is assembled by the germ-cell from the environment and whose character is determined by mysterious "factors" in the germ-cell. It is true that Prof. Dendy recognizes that to obtain its typical development the germ-cell must have an appropriate environment; but he apparently forgets that when this environment is changed the typical development is merely thwarted—it is not modified into something of another type. By no alteration of circumstances can a hen's egg be induced to develop into a duck.

Now the distinction between "soma" and germ-cell" is an utterly exploded one—and it may justly be characterized as a remnant of Weismannian superstition. Every cell of the body is a potential germ-cell, for the nucleus, which is the centre of the life of the cell, is alike in all of them. Whether a given cell will actually become a germ-cell or not seems to depend principally on its nutritional opportunities. Gatenby has shown that although it is true that germ-cells are set apart at a very early period in the development of the frog, yet these primitive germ-cells would only account for a small proportion of the eggs laid by the female frog during her first season of sexual activity. New germ-cells are produced throughout life by the peritoneal cells covering the ovary and the majority of the eggs owe their origin to these cells. Dr. Crew possessed a hen which for several seasons had laid eggs from which chicks were raised. This hen was attacked by tuberculosis; by this disease the ovary was destroyed: the bird thereupon regenerated a male gland or testis from the peritoneal covering of the ovary, became transformed into a cock and by successfully treading hens became the father of several chicks. In the case of the sea-squirts or ascidians the entire genital organs can be cut out and they are then replaced

by regeneration from the body-tissues. The only case which afforded any colour of justification for the Weismannian view was that of the Nematode worm *Ascaris*. In this creature the nuclei of the cells which are destined to form the ordinary tissues undergo a process of loss which is termed the *diminution of the chromatin*, whereas the nuclei of the germ-cells retain their pristine constitution unchanged.

Now this "diminution of the chromatin" was interpreted by the followers of Weismann to mean that the nuclei of the tissue-cells were undergoing specialization whereas the nuclei of the germ-cells retained all their potentialities unchanged. But the critical analysis of Boveri has demolished this fiction. He has shown that the change in the nuclei of the tissue cells is produced by a prior change in the protoplasm; it is the protoplasm and not the nucleus which constitutes the difference between germ-cells and tissue-cells.

Of course the germ-cell develops the qualities of the adult body only as it grows: and it is interesting to note how this is brought about. The nucleus changes the quality of the protoplasm by emitting into it certain substances: when the egg divides into many cells these substances become segregated from one another and confined in each case to certain cells, and so the great primary organs, skin, gut-wall and peritoneum or body-cavity lining are laid down. Then these primary organs act on one another by emitting chemical substances (hormones) into the body-fluids, and so the secondary organs such as eyes, ears and brain are developed from the skin, liver, pancreas and lungs from the gut-wall, and muscles and bones from the peritoneum. The regulation of the growth of one organ by some substance emitted by another is one of the most wonderful facts of development, but it in no way justified the extraordinary conclusions which Prof. Johnstone deduces from it. In the higher vertebrates in the later stages of their development this emission of hormones has been detected in three or four glands only; viz., the pituitary

at the base of the brain, the thyroid at the sides of the throat, the adrenal above the kidney and the sexual gland. According to Dr. Johnstone the secretions of these glands actually constitute the mental characters. Thus we are told that thyroid-centred individuals memorize well and are good thinkers, antepituitary types develop into scientists and philosophers—postpituitary types are masculine, etc. Now I have not the slightest hesitation in characterizing the whole of these statements as arrant nonsense. Prof. Johnstone appears to have taken at their face value some wild and baseless American speculations. The function of these endocrine glands, as they are called, is *to regulate growth*—if this function fails the body breaks down and ceases to become an available tool for the mind, but the same result is produced by any agency which interferes with growth. This will be obvious if we consider the case of what Dr. Johnstone calls the “ante-pituitary” gland (incidentally, I may remark that a good deal of decisive work on the functions and relations of this gland was done in my laboratory). If this gland is small and undersized growth is arrested and a relatively infantile condition of both mind and body results, if it is overdeveloped we get enormous growth (giantism) coupled also with mental lethargy. Obviously the mental condition is a secondary result of the bodily condition and has nothing to do with the specific quality of the pituitary secretion. Again, if we feed the axolotl (a large newt which normally spends its life in water and retains its gills throughout life) with sheep’s thyroid it will drop its gills and metamorphose into a land-newt; but we can get exactly the same result if we cut out the thyroid of the axolotl altogether and graft a piece of the pituitary gland of an ox under its skin. In a word the secretions of these glands affect the mind just as the general state of the body affects it, making us feel vigorous and fit or slack and unfit and no new “shaft of light” on mental structure emerges at all.

We now pass to a conception which both Prof. Johnstone and Prof. Dendy endorse, a contrast between the fixed constitution of the germ, and the fluctuations of the "soma": these latter are supposed to be due to the variations in the environment and to be non-transmissible. It is only fair to Prof. Dendy to say that he utters a "caveat" against taking this last assertion as proved. Now this view of the immutable character of the "germ-plasm" was erected into a dogma by Weismann, it was taken over by the Mendelian school of biologists, and like other dogmas, it has gained general acceptance by constant and confident re-assertion. Professor Johnstone and Prof. Dendy in reiterating it are only voicing a general opinion. Nevertheless, recent researches have shown conclusively that the constitution of the germ is alterable, although very slowly, by the external environment, and a brief sketch of these researches may now be given.

Kammerer in Vienna showed that if the common salamander in which the skin is black, mottled with yellow spots, be reared from youth on a background of yellow earth its yellow spots will enlarge and become connected together so as to form two longitudinal stripes on the back. If two such salamanders pair, their offspring when they leave the water are considerably yellower than were their parents at the corresponding age, so that the effect of the environment has been passed on. If these young be now divided into two lots, and one lot reared on yellow earth whilst the others are placed on black earth, it will be found that in both lots the yellow spots increase in size for the first six months and become connected together into two bands: then, however, the influence of the environment begins to tell: in those on the black background small dust-like spots of black begin to besprinkle the yellow spots, these become disconnected from one another and smaller, and finally, when the young have attained maturity, the yellow bands are represented by two rows of very small spots.

In the salamanders on the yellow background, on the contrary, the yellow stripes become broader and the black is displaced more and more till when the animals are mature they have become almost completely yellow.

Similar results were obtained by Durkhem working with the caterpillars and pupæ of the ordinary white butterfly. When the caterpillar pupates the chrysalis is usually of an opaque white colour peppered over with greyish dots. In a few cases (about 4 per cent.), however, both the opaque white and the greyish colour are absent and then the chrysalis appears green owing to its green blood shining through. If, now, the caterpillars just before and during pupation are exposed to orange light the formation of white and grey pigments is interfered with, and the proportion of green chrysalides rises to 60 per cent. If these are allowed to metamorphose into butterflies and if the butterflies are encouraged to pair and lay eggs, these eggs can be collected and an experiment similar to that of Kammerer instituted. Caterpillars reared from these eggs can again be exposed to orange light—when this is done 95 per cent. of the chrysalides are green, or they can be left in ordinary daylight and in this case 35 per cent. of the chrysalides turn green as opposed to a normal proportion of 3 per cent., so that in spite of the influence of the environment the effect on the parents of the different environment still makes itself felt in the coloration of the children.

Pavlov experimented with white mice to which he endeavoured to teach an association of ideas. He fed them once a day and just before feeding he sounded an electric bell. It required 300 lessons to teach the mice of the first generation to associate the sound with their food. But when families of mice were raised from these it was found that it required only 100 lessons to teach the second generation the meaning of the sound. Thirty lessons sufficed for the third generation and five for the fourth.

Prof. Dendy seems to me to miss the significance of experiments such as these when he speaks of somewhat similar experiments of Agar who claims to have produced a modification in the carapace of the water-flea *Simocephalus* by giving it a special food, and to have found that this modification was transmitted to the descendants. Prof. Dendy complains that in these experiments "no permanent change was effected in the germ-cells." Incidentally I may remark that the repetition of Agar's experiments in my laboratory led to the conclusion that in this case there was no transmission at all. But if habit be transmitted it is absurd to require that it should be passed on unchanged in a changed environment. A habit is a reaction to an environment; if the environment be changed it tends to form a new habit in opposition to the old one. The most we could hope to see is that when the environment persists unchanged the habit becomes intensified in succeeding generations, and that when the environment is changed a trace of the old habit persists especially in the early stages of growth. Both these requirements are fulfilled by Kammerer's and Durkhem's experiments. I regard the structure of animals as a secondary derivative of, and so to speak a solidification of, their habits past and present.

But we have also to consider cases of variations usually of large and conspicuous amount which occur suddenly and are inherited strongly—the so-called "mutations" to which such enormous importance is attached by the Mendelian school of biologists. These are supposed to be cases of "true hereditary variation" as opposed to environmental fluctuations by Prof. Johnstone—and even Prof. Dendy is much impressed by them though he wisely refuses to capitulate and will go no further than to assert that they are due to "blastogenic stimuli." It is well known that Prof. Morgan has built a whole edifice upon the appearance of these. He proposes to analyse heredity into units called "genes." The "genes" have captured the imagination of the

public, but few have taken the trouble to examine critically the evidence on which they are built. If they did so they would discover an amount of wild speculation and reasoning in a circle as would greatly surprise them.

That the chromosomes of the nucleus are the material vehicle of inheritance is agreed by all, for the head of the spermatozoon which carries the paternal influence into the egg on fertilization is nothing but a condensed mass of chromosomes. Since the chromosomes appear in the same species of animal in invariable numbers and in definite though different shapes it is a plausible idea that they have different functions to perform in the building up of the embryo---perhaps we might agree with Prof. Dendy that they emit different stimuli, though this is by no means proved. But when Morgan asserts that each chromosome is a linear accumulation of units called genes which can be juggled about like pieces in a picture puzzle it is time to enter a protest.

Now in certain cases different "mutations" occurring in the parents are scattered amongst the offspring in a random manner. In such cases Morgan assumes that these different mutations are "carried" by different chromosomes. In other cases "mutations" tend to be inherited together and then Morgan assumes that they are "carried" by the same chromosome. But the going together of these mutations is not absolute; and when they do not go together they are said to "cross over." As all cytologists know in the process of maturation of the germ-cell the chromosomes associate in pairs and then separate, to pass into different germ-cells. During this pairing it is assumed that associated chromosomes exchange bits of their substance, and so a "gene" which belongs to one chromosome can be passed to another. It is obvious that by a judicious use of the principles of association and crossing-over any possible conglomeration of characters can be explained. But that is not the only example of the "plasticity" of the gene hypothesis. For every grade

of mutation, every different deviation from the normal, Morgan thinks himself entitled to invent a new gene. Morgan's work, we all know, is based upon the banana-fly *Drosophila*—though in this fly in the ripe germ cell there are only four chromosomes Morgan and his pupils have already discovered hundreds of genes. Now when a gene has been invented as the cause of a mutation and has been relegated to a certain chromosome because of its association with other mutations is it disconcerting to Morgan to find the same mutation turn up in connexion with quite another group of mutations supposed to be due to genes situated in another chromosome? By no means, he merely invents a new gene producing the same mutation as the old one and all is well. Really it is difficult to deal seriously with such an elusive hypothesis.

But the strongest argument against regarding the genes as veritable units of heredity lies in their pathological character. As one of Morgan's own countrymen admits, they are "failures from the point of view of adaptation." They are indeed measures of the pathological damage which the germ has undergone. Take for instance the colour of the eye. This in the normal fly is dark red and from what we know of the function of the eye in other animals we must assume that this colour has some important duty to perform in the function of vision. The "mutants" of eye-colour are listed as vermilion, ruby, cherry, eosin, cream and white—all supposed by Morgan to be due to separate and independent genes but all obviously representing different stages in the reduction of the pigment. Now we know that this pigment is caused by the oxidation of a colourless substance called tyrosin and further that this process can be stopped at various grades of completion; these different intensities of red only indicate therefore different degrees of failure of a natural process.

Now a German zoologist, Tornier, working on goldfish which exhibit many Mendelizing mutations, has suggested a physiological

cause for all these mutations which I am convinced is the right one. He says that they are due to a weakening of the germ due to evil conditions-- lack of oxygen etc., surrounding its early development. The effect of this weakening is to undermine the "regulation" which binds together the various functions into a coherent and harmonious whole. Some parts of the embryo swell up by the imbibition of water and press on actively growing parts and distort them. Necessary materials fail to be worked up and are ejected, and cause a local starvation later on. This germ-weakening once started is however hereditary, and probably the parts to be weakened are the chromosomes. It is, however, clear that in endeavouring to explain the normal course of evolution, these "mutations" may be counted out, and further, that the genes are not primary units at all and throw no light on the constitution of the hereditary substance.

IV. By C. LLOYD MORGAN.

I HAVE been asked to contribute to this symposium from the point of view of one who has devoted some attention to comparative psychology and to genetic problems on the border-line of life and mind. Since I may not assume that the conclusions to which I have been led are generally accepted I can do little more than indicate my line of approach and show whither it leads. Limitation of space, moreover, precludes more than a bare statement of the hypotheses on which my conclusions are founded.

I proceed on the initial acceptance of correlation or concomitance of psychical events with *all* physiological events. This I call unrestricted correlation in contradistinction to the more restricted hypothesis that psychical events—psychoses in Huxley's usage—are correlated only with neuroses in some part of the brain or in some differentiated "sensorium."

On this understanding with every life-system from the amoeba or the fertilized ovum upwards, there is a correlated psychical system. This I call an "enjoyment." The complexity and the richness of the enjoyment in any organism—*e.g.*, stentor, starfish, thrush—is inferentially one with the complexity of its life. But enjoyment, as such, exercises no causal influence on the course of organic processes as studied by the physiologist. All such processes are accompanied by enjoyment; but there is no causal interaction between the one and the other.

Whatever, then, be the hereditary relation of the physiological nexus in successive generations, that too is the hereditary relation of the psychical nexus, since it is one and the same nexus considered now in physiological regard and now (inferentially)

in psychical regard. It follows that if a given character in the one be shown to be in some sense an "acquired character," its correlate or concomitant in the other is likewise and in the same sense "acquired." The biologists who have discussed what they deem to be in some sense "acquired" have done so with regard to the physiological nexus. And in this part of the discussion, it is not my purpose to intervene; for I am asked to say something which may perhaps be relevant from the psychological point of view.

Now if I be asked what exactly I mean by the psychological point of view and just what gives psychology its status as an autonomous province of inquiry, I reply that, under evolutionary treatment, when, and only when, there is evidence from which we may infer conscious guidance of behaviour, then, and not till then, there is the autonomous province of inquiry proper to psychology. This implies (1) that conscious guidance is the criterion of mind as the subject-matter of psychology and (2) that the psychical system of an enjoyment—say in stentor and perchance in some insects—may not have reached the status of a mind.

I am well aware that those whom Mr. E. S. Russell calls psycho-biologists contend that, say, in the development of the embryo there is what they regard as evidence of conscious guidance towards an end that is dimly—they sometimes say "blindly"—foreseen by that embryo. I cannot discuss this matter here. I must roundly assert that for my part I find no evidence that processes of embryonic development—and this holds also for many modes of primitive behaviour—are under any such conscious guidance as forms the subject-matter of inquiry in psychology. That many organic processes lead to an *outcome* that *we* can foresee is not, as I think, evidence that they are consciously guided to an end that the embryo, or an organism that behaves in certain primary ways, itself foresees.

I am also well aware that radical behaviourists contend that, in no sense of the expression "conscious guidance," does that which it is supposed to mean count in the course of evolutionary advance. This matter also I cannot here discuss. I can only roundly assert that there is, I think, a valid sense in which conscious guidance does count for progress, and that, for my part, I find abundant evidence quite low down in animal life from which it may be inferred.

Assuming then, as the hypothesis of unrestricted correlation implies, that *all* life-events—not neuroses only but all "bioses"—have psychical concomitants; and assuming that there is some stage of evolutionary progress at which conscious guidance (in some sense) comes on to the scene, we have to distinguish (*a*) enjoyment which just comes as an accompaniment of life in the absence of conscious guidance, and (*b*) that which accompanies certain physiological processes which afford provision for such conscious guidance as may be inferred from the evidence afforded by the behaviour which we can observe.

Starting from a behaviourist platform I urge that such physiological provision is afforded by the "conditioned response." Without denying that, in the absence of a nervous system there may be some analogous provision in the infusoria, for example, under Professor Kofoed's searchlight—I submit that the best line of scientific approach to a physiological interpretation of the requisite provision for conscious guidance is opened up by an inquiry into the conditioned response in vertebrates.

"It must, I think, be admitted," says Professor Dendy, "that the entire life of any organism consists of a series of responses to stimuli which reach it from various sources. The stimulus of fertilization, probably due to some chemical substance introduced into the ovum by the spermatozoon, initiates cell-division, and other stimuli follow in due sequence throughout the whole course of events." Now, taking the earlier stages in

this course of events for granted, let us concentrate attention on quite a late stage when a hierarchical nervous system is in being. Then there seem, on the evidence, to be *first occasions* in individual life of some observable form of behaviour in response to stimulation. Let us call these primary responses. Physiologically interpreted they imply initially permeable neurone-routes in the central nervous system ; we may call them primary routes. Then on certain modes of the stimulation of receptor-patterns there follow certain primary forms of behaviour ; and, from these observable facts we may infer, in each case, a primary neurone-route. Now let two such primary responses be elicited simultaneously or in close succession on several occasions. Then if sooner or later the one response is elicited by the other kind of stimulation there is a conditioned response, and there is presumptive evidence of the establishment, through relative increase of permeability, of a secondary or inter-connecting route within the central nervous system.

Diagrammatically we have on each first occasion—

Primary $a \rightarrow A \rightarrow x$.

Primary $c \rightarrow C \rightarrow y$.

But on subsequent occasions we have —

Secondary $a \rightarrow A$
 $\quad \quad \quad |$
 $\quad \quad \quad C \rightarrow y$.

May we not, without prejudice to other uses of the word, speak of secondary neurone routes, rendered permeable in the central nervous system under the conditioned response, as “acquired” in a sense that is pretty free from ambiguity ?

Now translate into psychological terms, building on Pavlov’s researches on salivation, but keeping in view the intact organism—say Fido in domestic life. Salivation is a primary response to gustatory stimulation of appropriate pattern. It is accompanied by its specific form of enjoyment. If a conditioned response

have been established salivation occurs on sight of food or when the lunch-bell rings. But this salivation is then "precurrent" to the primary stimulation of food in the mouth. Its accompanying enjoyment is therefore also precurrent.

In normal life such precurrent response with precurrent enjoyment is bound up with the evolution of distance-reception. Stated in a form permissible in so condensed a summary, one may say that the sound of the bell, sight of food, and on nearer approach its smell, are accompanied by that which I venture to call "foretaste in enjoyment." This foretaste *then and there present in current enjoyment* seems to be a guiding factor in the course of behaviour. And according as this foretaste in enjoyment (ante-dating enjoyment actually tasted) is pleasurably or disagreeably toned there is appetition or aversion under conscious guidance. After seizing two or three times boiled rice-grains appetition in the chick is well marked. But if on early occasions the rice-grains be medicated (soaked in dilute quinine) then after seizing two or three times aversion is equally well marked, and no rice-grain, medicated or not, is seized. The inferred foretaste in enjoyment seems to differ in the two cases; the observable behaviour differs; and, on the evidence, "foretaste" seems really to count as an accompaniment of present and current physiological events. In psychological terms, it has meaning in the light of which the course of behaviour is guided.

On this showing, when we try to dig down to evolutionary genesis, (1) conscious guidance is begotten in anticipation of, and in prospective reference to, coming events in such wise that behaviour forestalls a subsequent stage of normal routine, and (2) there is physiological provision for this in the anticipatory nature of the conditioned response or some analogous life-process.

In our present context then, if psychology has for its province of inquiry conscious guidance of behaviour, it does not come into the field of discussion until there is physiological provision for

the conditioned response or its analogue. Prior stages of biological development, up to and including the primary response, are (on this interpretation) preparatory to, but are not yet subject to, conscious guidance in the sense in which this expression is here used. If by "psychical nexus," "psychological nexus" be meant, its relation to the physical (physiological) nexus is in evidence only at a comparatively late stage of life with enjoyment.

Supposing that (again without prejudice to other use) one may apply the word "acquired" to secondary responses as distinguished from primary, we have in this context a pretty clear issue to be decided by observation and inference based thereon. Is there evidence on which we are as yet justified in saying that secondary neurone-routes, established in one generation, are so inherited as to be primary routes in a succeeding generation?

Pertinent here are Pavlov's recent observations to which Professor MacBride has referred. They seem conclusively to show that secondary routes are more readily established in successive generations. They do not yet show that a secondary route becomes a primary route—that, apart from *any* "lessons," auditory stimulation is followed by this response in behaviour. The number of occasions requisite to the establishment of a conditioned response is reduced in four generations from 300 to 5, but it is still a conditioned and not a primary response. In the chick avoidance of medicated rice-grains requires only 2 or 3 "lessons" (perhaps only one) in very young birds; seemingly more in older birds (three weeks) and, it appears, with less lasting result. There must, however, be *some* individual conditioning. I have never observed any young bird that avoided nauseous insects at sight. This is, so far as my experience goes, always a conditioned response.

None the less, Pavlov's recent observations are of great value. They open up the question: By what physiological means is the reduction of "lessons" from 300 in one generation to 5 in

the fourth generation effected? In the foregoing contributions stress has been laid on the internal secretions, the study of which has thrown so much light on the broader problem under discussion. In influencing the life of the organism they influence also the enjoyment correlated with that life, especially under visceral response in its emotional character; on which more might be said. But how this harmonic principle may be applicable, if at all, to the narrower problem in Pavlov's research, one cannot as yet clearly see. Still, the more fully we realize that there is probably no receptor-pattern, external or internal, that does not collaterally modify in some measure the whole physiological poise of the organism—that does not entail a new balance of harmonic integration—the richer will be the interpretative magna in which new suggestions of fruitful lines of inquiry will crystalize out:

In individual life there is little question that which one of several alternative neurone-routes is on this or that occasion the more permeable under like external receptor-patterns—i.e., in situations closely similar, as we judge—is determined by the existing physiological poise with consequent internal receptor-patterns; and there is little question that the existing physiological poise is partly determined by what may be called the “endocrine brew” of the time-being.

If we concentrate attention on neurone-routes and on “acquired” changes of permeability, under conditioned responses, we must steadily bear in mind that they are neurone-routes and imply stimulation of external patterns (or excitation of internal patterns) on the one hand, and motor or glandular responses on the other hand. Any such route is from *this* to *that*. To deal with the route by itself, irrespective of its whence and whither, is a bit of “vicious abstraction.” If, for example, we say that “it is apparently necessary for proper activation of the sexual centres of the brain that there should occur continuous

liberation of secretion from the reproductive organs into the blood," we must remember, as no doubt Mr. Julian Huxley remembered in writing these words, that "the sexual centres of the brain" are only partakers in the current "activation" within the organism as a whole. It is this organism as a whole that is steeped in the endocrine brew. Subject to changes in this brew the course of development proceeds, and one may at least surmise that the germinal seed of future generations is in some ways influenced by the "brew" in which all the living cells of the organism are bathed. In what exact ways it is influenced the researches of the future may enable us, or our successors, more clearly to understand.



VI

SIXTH SESSION : *July 13th, 1924, at 3 p.m.*

Chairman : PROFESSOR T. PERCY NUNN.

LE CONTINU ET LE DISCONTINU.

Par JACQUES CHEVALIER, professeur de philosophie à
l'Université de Grenoble.

1. Le problème du continu et du discontinu est un problème fondamental, qui se pose au début et au terme des sciences mathématiques et physiques, et qui, sous une forme ou sous une autre, se pose ou se posera également à toutes les autres disciplines humaines, naturelles ou morales. Les mathématiciens et les physiciens, se plaçant à deux points de vue d'ailleurs très différents, l'ont déjà soumis à une enquête approfondie. Mais ni le mathématicien, ni le physicien, ni aucun des spécialistes, ne peut prétendre le résoudre à lui seul : le philosophe a son mot à dire ; et ce mot est décisif. En effet, le problème du continu et du discontinu demeure avant tout, et au premier chef, un problème philosophique : chaque technique en circonscrit une frontière ; le domaine en son entier ne peut être couvert que par le philosophe, se plaçant à un point de vue synthétique, et c'est seulement dans la mesure où le savant est un philosophe que ses conclusions auront une valeur générale, une valeur réelle, une valeur humaine. Il faut que la science retrouve ici quelque chose qui lui est antérieur et supérieur.

La question est immense, et la tâche qu'elle impose à celui qui l'aborde paraît presque disproportionnée aux forces humaines. Elle mérite cependant d'être affrontée, et il est même nécessaire qu'on l'affronte, ne fût-ce que pour prendre nettement conscience des confusions, des équivoques, des glissements perpétuels que l'on opère lorsqu'on manie, comme c'est le cas ici, des termes qui recouvrent une variété de sens allant jusqu'à l'opposition. Les réflexions que l'on trouvera proposées dans les pages qui suivent, — réflexions dont l'origine remonte à certaines questions qui déterminèrent les expériences de cristallographie entreprises à Oxford de 1904 à 1908 avec Sir Henry A. Miers, — ne prétendent à aucun titre fournir la solution d'un problème qui peut-être n'en comporte pas : nous nous estimerions suffisamment payé de notre peine si elles pouvaient servir, si peu que ce fût, à le mieux poser.

Sur ce point, d'ailleurs, comme sur beaucoup d'autres, qui touchent aux réalités premières et dernières, on peut hardiment affirmer, quoiqu'il ait été de mode de penser autrement, que le progrès de la science a élargi le champ de notre vision, mais ne l'a pas déplacé. Il est heureux, certes, qu'il en soit ainsi : car il serait désolant pour l'homme de penser, comme le dit Cournot,* qu'« ses "droits à d'impérissables destinées" puissent "dépendre du degré de grossissement donné à une lentille de verre ou de la rencontre d'un os fossile." Pourtant, si la chose était telle, il faudrait s'y soumettre. Mais elle n'est pas telle. En ce qui concerne le continu et le discontinu, et quelles que soient sur ce point les préférences de chacun, c'est un fait que le développement des sciences, s'il a singulièrement étendu et précisé nos conceptions, n'en a pas changé le centre de perspective. Si notre connaissance de l'infiniment grand et plus encore de l'infiniment petit a fait d'immenses progrès depuis Pascal, en raison du perfectionnement des techniques, qui nous ont permis de compter

* *Traité de l'enchaînement des idées fondamentales*, 591.

les atomes et les ultra-microbes* que l'on ne peut voir, ces progrès laissent intacte la vue qu'il exprimait sur les deux infinis : ils n'ont fait que la confirmer et nous permettre d'en mieux appréhender la valeur ; à peine oserait-on prétendre qu'ils aient modifié d'une manière appréciable la doctrine platonicienne de l'unité et de la pluralité, cette doctrine que Platon nous dit avoir reçue d'une tradition immémoriale, plus proche que nous des dieux (*Philèbe* 16 C) ; en tout cas, nous sommes bien forcés d'avouer qu'ils n'ont pas avancé d'un pas la solution de la difficulté soulevée par Zénon d'Elée sur le mouvement, cette synthèse primitive et indivisible de l'un et du multiple, du continu et du discontinu. Et la raison en est sans doute que, notre perspective s'étant agrandie dans les deux directions, quoique d'un mouvement non uniforme, mais avec des avances ou des retards dont nous verrons tout à l'heure les conséquences, le milieu est resté le même, en sorte que l'homme, qui occupe ce milieu, comme l'avait déjà vu Pascal, est demeuré le meilleur centre de perspective sur les deux termes entre lesquels il se meut. Par ses progrès les plus récents, la science, qui a critiqué la notion de temps absolu, n'a pas aboli la notion d'une échelle absolue des grandeurs spatiales et de l'univers physique : si une semblable échelle existe, notre échelle à nous, c'est-à-dire l'échelle des grandeurs accessibles à nos sensations, se trouve comme légitimée ; et par contrecoup se justifie, dans la conception de la nature, un certain anthropomorphisme.

Or, de ce point de vue, il est évident que, dans l'ordre de la connaissance, le continu et le discontinu s'apparentent aux deux opérations fondamentales de l'esprit humain, à l'analyse, qui morcelle le continu, à la synthèse, qui lie le discontinu, et que, dans l'ordre de la réalité, ils correspondent à deux aspects fondamentaux des choses, puisqu'il est également vrai qu'il y a des

* D'Hérelle, *Le bactériophage*.

individus, donc du discontinu, et que ces individus réagissent les uns sur les autres, donc sont en continuité. Quelques découvertes qu'on fasse ultérieurement, il ne paraît pas que ni l'un ni l'autre de ces aspects doive jamais être réduit à une pure apparence sans réalité, ni que l'une de nos deux méthodes de connaître puisse jamais régner exclusivement sur notre science, comme la seule légitime. Dès lors, la question ne doit pas être posée sous la forme d'un choix entre le continu et le discontinu, entre la synthèse et l'analyse, comme si ces concepts étaient *contradictaires*, c'est-à-dire excluaient tout concept intermédiaire entre la pure continuité et la discontinuité pure, et comme si, d'autre part, ils ne pouvaient entrer que dans des propositions *collectives totales*, c'est-à-dire affirmant ou niant le concept de la totalité des sujets considérés, ou, si l'on veut, de l'univers en son entier. C'est pourquoi, dirons-nous en donnant aux mots tout leur sens, *il ne s'agit pas de savoir si le monde est continu ou s'il est discontinu, mais dans quelle mesure il est l'un et l'autre.*

Pourtant, toute simple et toute évidente que semble être cette position de la question, elle serait loin d'être admise par tout le monde, et il est très certain qu'au cours de l'histoire la question n'a presque jamais été posée en ces termes. Les hommes ont toujours pris, le plus souvent à leur insu, les deux concepts *contraux* de continu et de discontinu (analogues aux concepts de blanc et de noir) pour des concepts *contradictaires* (analogues aux concepts de blanc et de non-blanc), de telle sorte qu'il suffirait de prouver qu'une chose n'est pas continue pour prouver qu'elle est discontinue, et réciproquement. D'autre part, ils ont toujours tendu à croire que, s'ils établissaient, soit la continuité, soit la discontinuité d'un certain ordre de choses, il devait en être de même de la *totalité* des choses, sans se douter, en apparence, que la continuité ou la discontinuité qui règne dans un ordre ne règne pas nécessairement dans un autre ordre et ne saurait être conclue du premier au second.

Établissons brièvement ces deux points, en donnant quelques exemples des erreurs où l'on a été conduit par cette double confusion, et en tâchant d'en discerner la raison.

2. L'erreur qui consiste à prendre les concepts de continu et de discontinu pour des concepts contradictoires, excluant le milieu, et tels que l'affirmation ou la négation de l'un entraîne nécessairement la négation ou l'affirmation de l'autre, paraît résulter de cette tendance dialectique de notre intelligence qui, lorsqu'elle a désigné une chose par un symbole ou un mot, ne voit plus que le symbole ou le mot sans se référer à la chose qu'il désigne, et établit ainsi entre les choses les délimitations rigides, les oppositions tranchées, en un mot les contradictions, qui existent entre les mots, mais n'existent pas entre les choses. C'est sans doute en s'appuyant sur cette tendance dialectique de notre intelligence et en bénéficiant de sa généralité même, que Zénon d'Elée a pu formuler, au sujet du mouvement, des antinomies qui nous paraissent insolubles.

Qu'affirme Zénon ? Que la thèse de la pluralité de l'être pose nécessairement le nombre des êtres comme fini, et tout ensemble comme infini, car on peut toujours en intercaler d'autres dans les intervalles. Or, soit qu'on admette, avec les géomètres, que le temps et l'espace sont divisibles à l'infini (dichotomie, Achille), soit qu'on les suppose, avec les atomistes, formés d'éléments indivisibles en nombre fini (la flèche, le stade), rien jamais ne se meut ni ne peut se mouvoir.

Quel est le sens, quelle est la portée de ces arguments ? Il est évident, d'abord, que le mouvement, s'il est réel, exclut le continu *homogène*, car il suppose nécessairement, dans le continu temps-espace où il se produit, des distinctions fondamentales, et par exemple un avant et un après, successifs ou simultanés, temporels ou locaux : de fait, une doctrine comme celle d'Héraclite, qui pose l'universalité du changement, pose aussi, et nécessairement semble-t-il, la discontinuité ou, si l'on veut, la multiplicité

foncière de l'être. Or, et c'est précisément là ce que les arguments de Zénon tendent à prouver, la pluralité de l'être, ou le discontinu sous ses deux formes, arithmétique et géométrique, exclut le mouvement, tel du moins qu'il apparaît aux sens et tel que le conçoivent les héraclitéens : si l'être est multiple et discontinu, il est immobile. De sorte que, si le mouvement existe de quelque manière, la théorie de la discontinuité ou de la pluralité de l'être, qui le nie, est ruinée par le fait même.

Que telle soit la portée de la dialectique de Zénon et de sa double argumentation, sur le multiple et sur le mouvement, c'est ce que confirme ce texte décisif de Platon dans le *Parménide* 128 C : " Mes arguments," dit Zénon, " sont une défense de la doctrine de Parménide contre ceux qui l'attaquent par des plaisanteries et qui disent que, si l'être est un, il en résulte pour sa doctrine beaucoup de conséquences ridicules et contradictoires : mon livre répond aux partisans du multiple. Il leur rend la pareille avec usure et fait voir que l'hypothèse du multiple a des conséquences bien plus ridicules encore que celles de l'unité." Il ressort de ce texte que les arguments de Zénon, et sans doute aussi la thèse éléate en général, tendent moins à établir l'immobilité que l'unité fondamentale de l'être, indivisé, indivisible, absolument et essentiellement un et continu, et cela en montrant les conséquences absurdes auxquelles aboutit une conception pluraliste de l'être.

Comment, toutefois, garantir l'existence du mouvement ? comment le rendre même concevable ? Si l'on oppose le continu et le discontinu comme deux concepts contradictoires, on ne voit pas, il n'y a pas en fait, d'issue possible : car Zénon a établi que le mouvement, s'il est réel, exclut le continu ou le plein, et suppose le discontinu. Or, le discontinu à son tour exclut le mouvement. Dans l'un et dans l'autre cas, le mouvement est impossible : il exclut l'un, l'autre l'exclut.

Mais le mouvement n'est plus impossible, et l'on échappe au

dilemme, si l'on ne traite plus le continu et le discontinu comme les deux termes uniques d'une dialectique qui nous rejetterait sans cesse et nécessairement de l'un à l'autre. Et, ainsi, bien qu'elle n'ait pas été explicitement formulée par Zénon, on aperçoit une solution à la difficulté : car l'argumentation de Zénon, si elle démontre l'incompatibilité du mouvement avec la composition de l'être ou la discontinuité sous toutes ses formes, n'exclut qu'une certaine forme du continu, et laisse par là même la porte ouverte à une conception intermédiaire, comme celle de la " continuité mouvante " ou du " continu fluent " dont parle M. Bergson, qui serait en somme une synthèse supérieure de la continuité absolue et de l'absolue discontinuité, ou, plus exactement encore, la réalité dont ces deux concepts sont les expressions partielles. Et c'est pourquoi, au surplus, on pourrait aussi bien parler d'une *discontinuité liée* que d'une *continuité mouvante* : dans le cas d'Achille, par exemple, nous sommes en présence d'une *série* de pas *discontinus*, dont chacun par ailleurs est un *indivisible*. Continuité mouvante, discontinuité liée : telle est bien la donnée primitive de l'expérience, la seule qui soit susceptible de figurer le réel sans le déformer ; et c'est assez arbitrairement que l'esprit l'a découpée en deux concepts qu'il a opposés l'un à l'autre, comme si le réel se divisait et s'opposait selon le même plan, en s'interdisant par là même de jamais rejoindre le réel, qui est fait de leur union.

3. Car c'est un fait, d'autre part, qu'après avoir forgé ces symboles destinés à lui faciliter l'intelligence et le maniement du réel, l'esprit humain en est devenu l'esclave et n'a plus été capable de s'en affranchir ou de les dominer pour en faire usage. L'histoire du développement des sciences n'est, à certains égards, que l'histoire d'une perpétuelle oscillation de l'esprit entre les concepts de continu et de discontinu, d'infini et de fini, et cette lutte, ainsi que l'observe Henri Poincaré (*Matérialisme actuel*, p. 67), durera autant que l'humanité, " parce qu'elle est due à l'opposi-

tion de deux besoins inconciliables de l'esprit humain, dont cet esprit ne saurait se dépouiller sans cesser d'être : celui de comprendre, et nous ne pouvons comprendre que le fini, et celui de voir, et nous ne pouvons voir que l'étendue qui est infinie." Cependant, observons de plus près les choses : l'histoire, qui pose les problèmes, permet aussi, étant approfondie, sinon toujours de les résoudre, au moins d'en mieux connaître les données.

Le développement des sciences, avons-nous dit, n'a cessé d'agrandir le champ de notre vision dans les deux directions : cela est vrai ; mais il ne l'a pas agrandi simultanément dans l'une et dans l'autre. Tous les progrès que nous avons accomplis du côté de l'unité et du continu ont eu pour contrepartie des progrès du côté de la multiplicité et du discontinu, et réciproquement : cela est encore vrai ; mais leur marche égale ne s'est pas faite selon le même rythme : leur période ne coïncide pas, l'un a toujours été soit en avance, soit en retard sur l'autre, il n'est jamais arrivé qu'ils fussent au même niveau : bien plus, toute victoire de l'un a toujours paru marquer pour l'autre un recul et s'être faite à ses dépens. Tout s'est donc toujours passé comme si l'esprit humain était incapable d'embrasser dans un même regard ces deux termes : mais, se portant toujours de l'un à l'autre sans modération et sans mémoire, oublieux de ce qui fut hier et imprévoyant de ce qui sera demain, il a toujours pris pour une conquête définitive et pour un état final ce qui était seulement la position, éminemment temporaire, d'un pendule oscillant sans cesse d'un pôle à l'autre. Il se peut que cette limitation de notre vue soit nécessaire au progrès des sciences, et qu'un savant doive, pour creuser jusqu'au bout son champ, faire comme si rien d'autre n'existait : mais le philosophe doit se garder d'agir de même, et le savant lui aussi, pendant qu'il travaille, doit soigneusement s'interdire les inductions incomplètes et les généralisations hâtives qui étendent à l'univers une vérité partielle par définition et projettent dans l'absolu une proposition

toute relative. C'est ainsi, pourtant, qu'à certaines époques les esprits, imprégnés de l'idée de continuité, la voient et la mettent partout, tandis qu'à d'autres époques règne le discontinu seul.

La pensée de Leibniz est dominée tout entière par l'idée de continuité ou d'harmonie : il y voit la marque du réel et de son auteur infini, de sorte qu'en passant du nombre à l'étendue géométrique et de celle-ci aux réalités physiques, puis psychologiques, le discontinu décroît et le continu croît. Mais ce continu, tel qu'il le conçoit, est tout autre chose que le continu homogène et uniforme de l'étendue cartésienne : c'est un continu concret, dont la continuité abstraite et la discontinuité abstraite ne sont que les éléments ; et ainsi le principe de continuité ne saurait être séparé du principe des indiscernables, qui affirme la différence qualitative et interne des individus, des monades. Toutefois cette logique du continu concret et réel, conçu comme l'harmonie des deux notions abstraites de continu et de discontinu, était trop subtile et trop riche pour être tenable. On la tira très vite vers une logique de la continuité abstraite, érigée en absolu, et, encouragé par le succès de la physique mathématique, par les progrès qu'avait permis l'application du calcul différentiel à l'étude des phénomènes naturels, on étendit sans discernement à l'univers entier l'axiome *Natura non facit saltus*, arbitrairement séparé du principe d'individualité, qui en était, pour Leibniz, le complément indispensable. De son application à la biologie naquit le dogme d'une évolution continue, insensible, où s'évanouissent les types et les individus : et ce dogme ne tarda pas à régir les sciences sociales et morales, sans en excepter la politique même : c'est ainsi qu'un Burke se fonde sur le principe supérieur d'analogie entre l'ordre de la nature et l'ordre de l'humanité pour condamner la Révolution française et glorifier l'hérédité sociale et la tradition ; et de nos jours encore, combien d'esprits faussement scientifiques réduisent l'humanité à une poussière homogène, bêtement continue, où les pays, les peuples,

les nations et les races voient leur individualité méprisée comme un préjugé illusoire, alors que toute la grandeur de la vraie science historique consiste dans cette science de l'individuel !

L'ambition de plusieurs générations de savants avait été d'exprimer toute discontinuité en termes de continuité, comme si la discontinuité n'était qu'une apparence. Tout le travail de la science contemporaine a consisté à réintégrer le discontinu dans la science, au point que des esprits étroits et systématiques pourraient se demander si l'avènement de la discontinuité n'est pas arrivé. A la doctrine de la continuité absolue et universelle tend à se substituer de nos jours une conception qui, attentive à tout ce que la matière présente de discontinuités,—mouvement brownien et ses extensions, structure granulaire de l'électricité, *quanta* d'énergie, mutations brusques,—instaure dans les sciences de la nature un atomisme en apparence irréductible. La physique moderne aboutit ainsi à établir, au sein d'un milieu continu, la discontinuité d'un monde dont les lois, selon elle, doivent être interprétées, soit comme l'expression d'édifices symétriques construits sur des nombres entiers simples (atome de Bohr), soit comme le résultat statistique d'un très grand nombre d'événements n'obéissant qu'au hasard (théorie cinétique des gaz). La propagation même, qui implique et exige la continuité, n'est-elle pas en voie de se rapprocher à nouveau de l'émission ? Si elle pouvait y être réduite, il ne resterait plus rien qui échappât aux prises du discontinu : le continu ne serait plus qu'une trame vide, un espace virtuel, qui perdrait toute réalité pour ne laisser subsister que l'ordre essentiellement relatif de réalités discontinues. Le réel, à tous ses degrés, serait régi par les nombres.

4. Cependant, l'histoire est là pour nous enseigner la prudence. Quelque effort que l'on ait fait pour résoudre l'antinomie en supprimant l'un des deux termes, ces efforts ont été vains : le problème se pose toujours à nouveau. Qui ne voit, au surplus, que, dans ses tentatives répétées pour tout réduire soit au continu,

soit au discontinu, l'esprit humain cède paresseusement à l'une de ces modes intellectuelles qui se propagent par la force de l'imitation et ne peuvent se justifier qu'à l'aide d'analogies superficielles et le plus souvent verbales ? Beaucoup plus intéressante, plus féconde et plus vraie que ces tentatives toujours renouvelées est l'impuissance même de l'esprit à s'y tenir, et cette impuissance se traduit par le mouvement incessant qui nous ramène d'un terme à l'autre, dans la poursuite d'une fin qui les dépasse l'un et l'autre.

Cette fin idéale, qui est le réel, est sans doute hors de notre prise : mais elle doit orienter notre recherche et servir de règle à notre interprétation des faits, parce que seule elle est susceptible d'en déterminer le sens et l'usage. Avons-nous quelque moyen de la pressentir ?

Pour juger de la réalité des choses, il faut les voir, si l'on peut ainsi parler, dans un milieu à trois dimensions. On ne saurait manifestement se contenter d'une représentation linéaire. La continuité ou les discontinuités qui nous apparaissent sur une ligne ne sont pas absolues : elles sont relatives à un certain point de vue que nous avons adopté sur les choses, à une certaine manière de les aborder, ou, si l'on veut, à un cheminement. Il y a des cheminements continus entre des phénomènes discontinus, il y a des cheminements discontinus entre des phénomènes qui, par une autre voie, sont continus : une crevasse infranchissable peut être tournée. Pour savoir si elle peut l'être, il faut donc s'écarter de la trajectoire linéaire, et couvrir ou inspecter toute la surface. De même, il ne suffit pas de voir les choses en surface : il faut encore les considérer en profondeur. Là, on s'aperçoit que certaines continuités superficielles peuvent recouvrir une discontinuité profonde, aujourd'hui masquée à nos regards : tels des affleurements de couches géologiques arasées par la dénudation : et l'on s'aperçoit que certaines discontinuités superficielles sont pareilles aux traces visibles laissées sur le sable

par les pas d'un être qui s'est mu d'un mouvement continu : en sorte que, dans l'un comme dans l'autre cas, il serait suprêmement imprudent de conclure de ce qu'on voit à ce qui est ou a été, de la continuité superficielle à la continuité profonde, ou de la discontinuité superficielle à la discontinuité profonde et réelle.

Mais il y a plus : une vue statique des choses, même en profondeur, ne suffit pas. Pour comprendre le réel, il faut généralement l'appréhender dans son mouvement interne, dans sa direction et dans son rythme propres. Ainsi Pascal a très fortement marqué que la succession des ordres, discontinue à la montée, ne l'est pas à la descente : on ne peut passer de l'ordre des corps à l'ordre des esprits, ni de celui-ci à la charité, par aucun accroissement de l'ordre inférieur, pas plus qu'on ne peut en multipliant les points obtenir une ligne, ni en multipliant les lignes obtenir une surface. Mais, vu d'en haut, opéré d'en haut, le passage de l'ordre supérieur à l'ordre inférieur est continu : la nature ne peut d'elle-même se hausser à la surnature, mais la grâce s'épanouit sur la nature et la transforme intérieurement. Les ordres nous apparaissent comme une série de couches transparentes superposées : par un jeu de réflexion totale, la lumière qui vient des couches inférieures ne peut être pas dans les couches supérieures : celles-ci, par leur clarté même, sont comme un miroir éblouissant qui arrête les regards, en sorte que d'en bas on ne voit pas le ciel. Mais en sens inverse les rayons passent, et des couches supérieures le regard plonge dans les couches inférieures, il les pénètre et les embrasse.

Toutefois des images ne sont pas des preuves. Il nous faut tâcher d'expliquer et de justifier de proche en proche notre pensée par des exemples empruntés aux différentes sciences.

5. La mathématique, science purement intellectuelle des formes idéales, se réduit en dernier ressort à l'analyse, dont l'élément fondamental est le nombre entier. Rien de plus discontinu que le nombre, même si on ne l'étudie pas sous sa forme arithmétique, comme dans la théorie des nombres premiers.

Cependant, au premier abord, la mathématique nous présente à côté du discontinu le continu, à côté du nombre l'espace ; et il est incontestable qu'historiquement elle procède d'une notion du continu spatial fournie par la géométrie. Mais précisément tout l'effort des mathématiciens a consisté à se libérer de la géométrie, à ne plus "voir dans l'espace," et à édifier la mathématique tout entière sur le seul nombre entier. Le paradoxe est qu'elle y a réussi ; cette science, que l'on a toujours considérée comme fondée sur la seule identité, est arrivée, au prix d'un très long effort, à élaborer ou plus exactement à *construire*, en partant de la seule quantité discrète, et indépendamment de toute intuition, une certaine notion du continu, qui n'a d'ailleurs que le nom de commun avec le continu spatial : la continu, pour le mathématicien, c'est la puissance illimitée reconnue à l'esprit d'insérer des termes tous distincts dans un intervalle donné, sans y laisser de coupures, puisque de cette coupure même il fait un nombre nouveau. Telle est, en effet, la conception la plus moderne du nombre irrationnel, sur lequel s'édifie l'analyse tout entière. Est-ce à dire cependant que la mathématique soit parvenue à tout réduire à la pure discontinuité analytique ? Observons de plus près ses démarches : on s'apercevra que, pour opérer cette réduction, elle a dû joindre à l'analyse la synthèse et recourir à un principe extérieur et supérieur d'indéfini, d'illimité, qui présente un caractère d'un tout autre ordre que le discontinu, quoiqu'il soit déjà impliqué dans la notion de suite illimitée des nombres entiers. La mathématique moderne est construite sur le nombre et sur l'infini. Le continu n'y est représenté que par la notion d'infini : mais il y est représenté par elle.

Quelle est la relation du continu mathématique ainsi défini avec la notion commune du continu tel qu'il se présente à l'intuition ? Le mathématicien, avons-nous dit, n'a pu raisonner sur le continu qu'en éliminant de cette notion tout ce qu'elle contenait de spatial et de géométrique, et en la ramenant, par une

démarche d'ailleurs toute spéciale, au discontinu, seul accessible à l'intelligence mathématique : et ainsi, après avoir fait la mathématique avec la géométrie, après avoir raisonné sur la grandeur spatiale et sur le mouvement comme si s'étaient là des notions élémentaires, le mathématicien a été amené à considérer qu'en étudiant l'espace et le mouvement on sort de l'analyse mathématique pour entrer dans le domaine de la physique ; ce qui avait été le point de départ est devenu pour lui le mystère inexplicable. Inexplicable, et cependant réel, et même, en un certain sens, incorporé à la mathématique : car, chose remarquable, ce continu mathématique, qui est un pur signe intellectuel, et qui, malgré l'identité de nom, n'est pas homogène à l'intuition physique et commune, exprime le continu physique et permet de traduire les lois des phénomènes en un langage analytique, de manière à nous donner des phénomènes une image qui, sans les recouvrir, les représente cependant avec une profonde fidélité. La mathématique, qui est une construction idéale, jouit donc de cette propriété extraordinaire, qu'elle est une interprétation légitime, et jusqu'à un certain point fidèle, d'une réalité dont les éléments sont d'une tout autre nature : le premier succès de cette interprétation a été la géométrie analytique ; le second, plus important, a été la physique mathématique.

Le continu, pour l'analyse, est le résultat d'un très long effort : pour la physique, comme pour la géométrie, il est la forme même de l'intuition. Pour l'une, il est une conquête ; pour les autres, un point de départ. En passant de l'analyse à la physique, nous passons d'un monde à un autre monde, du monde des formes intellectuelles au monde des formes sensibles : dans ce passage, le problème change de sens.

Qu'est-ce que la physique ? A l'origine, la science physico-chimique prétendit être une théorie de la matière, des éléments qui la composent, des phénomènes dont elle est le siège : les physiciens grecs la concurent essentiellement comme une science

du discontinu, et l'atomisme lui fournit sa première formule cohérente. D'autre part, toute la physique moderne, depuis Galilée, s'est constituée en fonction du continu qu'implique le mouvement. Les premiers problèmes qui se posèrent aux physiciens modernes, ce furent les problèmes de la dynamique : or, on y voit apparaître immédiatement les notions les plus fondamentales du mouvement, vitesse et accélération, qui sont comme l'essence du continu. Cependant, en serrant de plus près la réalité physique, on fut ramené de force à la discontinuité. La chaleur et la lumière, dont on aborda l'étude après celle du mouvement, s'attachent dans leur source à la matière discontinue, bien que par leur propagation elles mettent en jeu les problèmes du mouvement et de la continuité, indépendamment de toute matière transportée. L'électro-magnétisme enfin réunit et affronte, sous leurs formes les plus subtiles, parce que les moins visibles, les plus affranchies de l'intuition sensible, pragmatique, le discontinu et le continu : le discontinu, puisque l'électricité ne saurait être considérée comme un fluide homogène et que l'atome d'électricité paraît bien être un fait acquis à la science : le continu, puisque ces centres, les électrons, sont animés de mouvements continus et que, par ces mouvements, ils propagent à travers l'espace un champ électro-magnétique, représenté par les équations de Maxwell, et qui, pour subsister, n'a même plus besoin du support matériel, l'éther, qu'on lui supposait, sans en pouvoir d'ailleurs rien imaginer ni rien dire. Une chose a disparu, au moins des théories actuelles de la science : et c'est cette conception fluide qui, entre les mains d'un Kelvin, avait suscité de si admirables efforts pour construire la matière à l'aide du seul continu. Aujourd'hui, la notion de discontinuité a pénétré dans tous les domaines, elle s'est imposée partout : mais elle n'a pu s'imposer au point d'éliminer le continu ; celui-ci, au contraire, demeure plus indispensable que jamais. C'est ainsi que la lumière, après avoir été réduite par la théorie de l'émission à un mouvement de corpuscules, puis par la théorie

de l'ondulation à la propagation d'un mouvement vibratoire dans un milieu continu, nous apparaît à l'heure actuelle, surtout depuis les plus récentes recherches sur les rayons X, comme fille du continu et du discontinu, de l'atome et du mouvement. Le physicien voit donc poindre une réalité qui n'est pas la continuité pure, qui n'est pas davantage la discontinuité pure, mais qui se tient dans l'entre-deux, en sorte que la seule théorie capable de la figurer d'une manière adéquate serait une théorie qui, revenant à une conception des mouvements des particules analogue à la théorie newtonienne de l'émission, pourrait et devrait cependant maintenir les caractéristiques essentielles de l'hypothèse ondulatoire : " on trouve quelque chose de cinétique dans les rayonnements vibratoires et quelque chose de périodique dans les projections de corpuscules, et tout cela rend chaque jour plus tentant de penser qu'une même réalité se présente à nous parfois sous sa face cinétique et parfois sous sa face ondulatoire " (De Broglie, *Rayons X*, p. 17).

Qu'est-ce à dire ? Continu et discontinu, en physique, se complètent et s'impliquent au point d'être inséparables. Ils apparaissent comme deux notions relatives qui se succèdent régulièrement par un " renversement du pour au contre, " à mesure que l'on pénètre plus avant dans la constitution de la matière. En observant de plus près le continu, on trouve, à un autre étage, du discontinu ; en approfondissant le discontinu, on y trouve une certaine continuité. Les deux, dans le réel, sont toujours simultanés. On a cru longtemps à tort qu'ils s'excluaient : la théorie du continu fluide supprimait les individus avec tout le dénombrable ; la théorie de la poussière exaltait les individus en mettant entre eux des frontières rigides. Or, il y a des individus physiques, et ces individus sont distincts, ou plus exactement distinguables, mais ils ne sont pas séparés, ou plus exactement séparables. Je puis compter trois nuages dans le ciel ; mais je ne puis en tracer les frontières. Une représentation tactile

des choses se refuse à les dénommer discontinues si l'on peut passer de l'une à l'autre par un mouvement ininterrompu, et elle se refuse à les dénommer continues si elles sont dénombrables. Le réel est beaucoup plus complexe : car il nous montre des objets qui se pénètrent intimement sans se confondre, et des objets qui, sans être limités par des frontières ou séparés par des vides, peuvent cependant être considérés à part, comme des individus.

6. De telles considérations nous amènent tout naturellement à dépasser les symboles logiques que crée le mathématicien, aussi bien que les relations temporelles et spatiales qu'étudie le physicien, pour tenter de pénétrer dans un autre monde, qui est réel, actuellement réel, comme le monde du physicien, et cependant affranchi en quelque manière de la double intuition temporelle et spatiale, comme le monde du mathématicien. Il nous faut tâcher de voir si nous ne retrouverons pas le continu et le discontinu sur ce nouveau plan. Et pour cela, commençant par la notion qui nous est la plus accessible, nous étudierons d'abord la discontinuité de certains phénomènes qui ne sont, à proprement parler, ni spatiaux, ni temporels, bien qu'ils se produisent dans le temps et puissent être représentés dans l'espace.

Écartons tout de suite certaines formes très contestables, et probablement illusoire, de discontinuité. On sait que certaines substances, notamment des liquides organiques, présentent des phénomènes de dispersion *anormale* : en d'autres termes, tandis que leur indice de réfraction varie très lentement avec la longueur des ondes, électriques, lumineuses, qui se réfractent à leur intérieur, il arrive que, pour certaines bandes, très limitées, de variations de ces longueurs d'ondes, l'indice de réfraction subit brusquement des variations importantes, puis, la zone perturbée une fois passée, le phénomène reprend son allure de variation moyenne et continue. Est-ce à dire que la matière ait changé de constitution sous l'influence des ondes de cette longueur particulière ? Pas

nécessairement. Mais les périodes propres des agrégats moléculaires qui constituent les divers stades possibles de décomposition du liquide ont pu présenter une valeur voisine des périodes des vibrations électriques auxquelles ce liquide était soumis : tout ce qu'on est en droit de conclure, c'est que les unes et les autres sont entrées en résonance dans ce cas particulier, et c'est tout. On pourrait multiplier de tels exemples en les empruntant aux aciers, aux fers, aux fontes, aux alliages métalliques en général, dont les propriétés électriques, thermiques et magnétiques se traduisent, quand on les représente graphiquement en fonction d'une abscisse simple, force magnétisante, température, etc., par des pointes dans les courbes.

Les phénomènes de résonance sont-ils, à proprement parler, des phénomènes de discontinuité ? Là encore, il faut distinguer : une pointe dans la courbe d'un phénomène est bien une discontinuité, puisqu'on peut la distinguer, l'individualiser : mais elle n'est qu'une phase d'un phénomène continu avec qui elle se relie sans coupure.

Plus réellement discontinus sont les phénomènes d'instabilité et de déclenchement, avec chute ou rupture d'équilibre. Tout état subit des variations. Si cet état est stable, les variations oscillent autour d'une position d'équilibre, qui persiste comme un type idéal, individualisé : plus on s'écarte de cette position moyenne, plus on tend à y être ramené. Si, au contraire, l'état est instable, plus on s'en écarte, plus on tend à s'en écarter, et il suffit même d'une modification très légère, par rupture d'équilibre ou déclenchement, pour déterminer une chute ou un écart accéléré par rapport à la position initiale. Prenons pour exemple de *labilité* les phénomènes de cristallisation. Ces phénomènes eux-mêmes sont plus complexes qu'on ne le croit communément ; car la mesure de l'indice de réfraction et diverses autres expériences concordantes ont montré qu'une solution sursaturée, lorsqu'on abaisse la température, passe par deux états très différents,

métastable et labile, que marque un changement soudain de la solution : dans le premier, les cristaux n'apparaissent et ne croissent, lentement et individuellement, que sur une particule du sel, ou d'une substance ayant même volume moléculaire et même *structure* interne : dans le second, la cristallisation, qui en couche mince se produit soudainement sous la forme d'un réseau microcristallin géométriquement parfait, peut apparaître d'une manière spontanée, mais elle est induite de préférence par une substance ayant même *symétrie* et par conséquent mêmes angles. Or, la structure interne des cristaux, telle qu'elle nous a été révélée par les belles investigations de Braggs, est autre que la symétrie et ne coïncide pas toujours avec elle.

Quelle est la signification de semblables phénomènes, et à quel titre peuvent-ils être appelés discontinus ? Qu'un germe produise la résonance d'un milieu qui est en accord avec lui, rien de plus naturel : ce germe est un simple indicateur du sens d'ailleurs très caractéristique, dans lequel veut tomber la solution sursaturée, soit dans le métastable, soit dans le labile. La résonance du germe ne constitue pas un phénomène de discontinuité véritable. Mais le déclenchement d'une transformation ou d'un mouvement tel que la cristallisation, dans un état instable comme sont, à divers titres, les états métastable et labile, constitue au premier chef un phénomène irréversible et discontinu, et, chose plus remarquable encore, un phénomène discontinu donnant naissance à un être discontinu. En effet, un liquide qui cristallise, c'est l'apparition d'une certaine symétrie ou d'une certaine structure géométrique dans un milieu isotrope : tout cristal, même cubique, à la différence d'un liquide à l'état parfait, contient des directions privilégiées, ainsi que le prouve l'existence de plans de clivage rigoureusement définis suivant ces directions, et susceptibles d'être comptés comme elles : la symétrie et, à plus forte raison, la structure d'un cristal nous présentent une discontinuité radicale, d'ordre non seulement numérique, mais

polyédrique. Et ces êtres discontinus apparaissent d'une manière discontinue, par saut brusque.

La loi de transformation naturelle d'un être ou d'un phénomène paraît donc consister en une série de passages d'états stables à états stables par des positions instables. Suivant qu'on envisage la transformation d'étape à étape ou à travers leur succession, le même phénomène apparaîtra comme discontinu ou comme continu, mais en un sens tout différent du sens tactile que nous attachons à ces mots. Il y a, dans les choses comme dans les phénomènes, une certaine continuité, mais avec des noyaux dénombrables.

Or, telle est précisément la loi de l'évolution biologique, considérée en dehors de toute hypothèse. La succession des espèces vivantes dans les couches géologiques dénote en gros un ordre défini, une hiérarchie régulière, d'où l'on a cru pouvoir conclure une évolution continue. Cette évolution s'est-elle produite réellement, temporellement, dans la filiation des espèces ? C'est une simple hypothèse, et elle est aujourd'hui plus que douteuse, car les belles recherches du Prof. Vialleton sur la morphologie des vertébrés tétrapodes paraissent démontrer l'impossibilité du transformisme. D'ailleurs, fût-elle vraie, cette hypothèse n'expliquerait rien : il faut sortir du temps pour expliquer ce qui se passe dans le temps ; le problème de l'évolution se pose sur un autre plan que le plan temporel. Or, si l'on fait effort pour s'élever à ce plan, on observe que tout se passe comme s'il s'était produit quelque part une évolution continue, traduction d'un geste indivisible, intemporel, de la nature. Mais, d'autre part, il est non moins évident que des formes ne se sont pas déposées uniformément et en nombre infini tout le long de ce trajet continu : la nature, dans ce mouvement, a accroché certains *types d'équilibre*, en nombre limité, qui représentent chacun une certaine *idée*, un certain *usage* naturel, une certaine adaptation de l'être vivant à lui-même et au milieu. Ces types d'équilibre, seuls viables, ce sont les espèces, lesquelles sont, quoi

qu'on fasse et quoi qu'on dise, discontinues et relativement immuables : elles n'évoluent pas, mais, comme l'ont montré de Vries et Zeiller, elles apparaissent tout d'un coup, elles se maintiennent aussi longtemps qu'elles le peuvent, puis, lorsqu'elles ne sont plus adaptées au milieu, elles disparaissent.

A l'autre bout de l'échelle, dans ce monde purement idéal d'objets qui sont créés par l'esprit, mais qui lui sont ensuite donnés et lui résistent, comme les idées qu'ils expriment, dans le monde des êtres mathématiques, on sait que le calcul intégral a mis en lumière certaines fonctions transcendentes qui ont des propriétés distinctes et comme une individualité véritable ; et, bien qu'on puisse souvent passer d'une manière continue de l'un à l'autre de ces êtres mathématiques, les intermédiaires n'ont pas l'importance des types d'équilibre qu'ils relient.

Que nous ayons affaire ici à une loi tout à fait générale, indépendante de son objet et applicable à tous les objets, c'est ce que prouveraient d'innombrables exemples, sans analogies visibles ni surtout tangibles.

Prenons la croissance d'un chêne : elle peut apparaître comme un type de croissance continue, bien que cette croissance ait ses rythmes, et que ni les hivers ni les automnes ne s'y inscrivent au même titre que les printemps et les étés. Or, le volume utilisable et la qualité n'augmentent pas régulièrement avec l'âge : leur accroissement de valeur se fait par sauts. Et la raison en est que, dans cette croissance continue, l'arbre, à de certains points, atteint une valeur soudainement différente et incomparable, parce qu'elle coïncide avec un *usage* humain, avec un *type* qualitativement distinct et autonome.

Faites varier d'une manière continue un paramètre : pour les valeurs du paramètre inférieures à un nombre donné, vous aurez une certaine forme ; pour les valeurs supérieures à ce nombre, vous aurez une autre forme. Et ces formes sont incomparables. Accroissez d'une quantité minime la vitesse de rotation d'une

planète, et vous rendez possible l'existence d'une atmosphère, par conséquent l'apparition de la vie, qui pour une valeur inférieure était impossible. Faites une dernière retouche au cerveau de l'animal, et vous le rendez apte à servir d'instrument à la pensée, qu'il était auparavant inapte à recevoir.

Ainsi, d'un bout à l'autre du réel, il y a des *idées*, des *formes* ou des *types d'équilibre*, qui sont des êtres autonomes, discontinus, et qui représentent, parmi tous les possibles, ceux qui sont pensables et qui sont réalisables. De l'une à l'autre de ces idées la nature fait des sauts qui ne sont pas des coupures ; elle fait des bonds qui ne sont pas au dessus de vides. Elle marche par étapes. Elle se repose, elle s'arrête. Elle a pu s'organiser suivant des jours. Et ces jours sont précisément les *moments* où elle atteint et réalise les formes stables, pensées par l'esprit.

S'il est vrai de dire, en un certain sens, que la nature ne fait pas de sauts, il faut ajouter que l'esprit en fait. L'axiome *Natura non facit saltus* doit être complété par cet autre axiome, qui seul donne au premier tout son sens : *Spiritus facit saltus*.

7. Cependant cette double maxime elle-même n'exprime qu'une face de la réalité. Envisageons en effet les formes, ou les idées, ou les types d'équilibre, non plus seulement du dehors, en tant qu'ils sont distincts les uns des autres, mais du dedans, en tant que chacun d'eux est lui-même : envisageons, non plus la manière dont la nature passe de l'un à l'autre, mais la manière dont chacun d'eux s'organise sur un plan qui lui est propre ; considérons d'abord, pour préciser les idées, la durée dans laquelle s'inscrit le développement de tout ce qui est, et que l'on peut prendre comme caractéristique de cette réalité interne. Le temps réel est-il continu, comme le croit M. Bergson ? est-il discontinu, comme le suppose Descartes ? En un sens, on doit dire, avec un Bergson et un Le Roy, que toute durée est continue, et que les instants dans lesquels la morcellent nos sens et notre intelligence, agents d'oubli, ne sont que l'illégitime traduction

dans le temps de ce qu'est le point dans l'espace. En un autre sens, on peut penser avec Descartes que la durée est foncièrement discontinue, parce qu'elle procède d'une discontinuité initiale, d'une création, non seulement *ex nihilo*, mais *post nihilum*, en sorte que l'après n'implique pas nécessairement un avant, ni l'avant peut-être un après. Mais cette seconde conception ne fait, en fin de compte, que rejoindre la première et la compléter, si l'on admet, comme il faut bien, semble-t-il, l'admettre, que la continuité temporelle et intuitive n'est au fond, pour la métaphysique comme pour l'analyse mathématique, que l'aspect sensible d'une réalité intemporelle, création de Dieu dont on n'a plus le droit de dire qu'elle soit ni instantanée, ni éternelle, au sens humain de nos pauvres mots.

Ce qui serait continu, ce ne serait donc pas le temps lui-même, mais la réalité intemporelle qui s'y exprime et qui le crée, en quelque manière, continuellement. Ainsi, la spiritualité de l'âme serait mise en évidence par le pouvoir qu'a l'esprit d'établir la continuité de l'avant à l'après, grâce à la mémoire et à la volonté qui les lient. Considérons, en effet, parmi toutes les réalités qui durent, celle qui nous est le plus directement accessible, le moi ; et, dans le moi, considérons l'acte de l'esprit qui nous est le mieux connu, l'effort, tel qu'il se révèle à la conscience. Tout porte à croire que les éléments nerveux ne sont pas en continuité, mais en contiguïté, et que l'influx nerveux s'y propage d'une manière discontinue, entre éléments accordés suivant un même rythme de durée. D'ailleurs, l'influx nerveux lui-même, c'est-à-dire la succession des ondes nerveuses, consiste très probablement en une série de contractions et de dilatations, analogues à celles qui parcourent une corde vibrante : ces ondes paraissent identiques, alors qu'elles ne sont qu'uniformes. Cependant, l'effort est continu ; il se traduit à notre conscience par une continuité, qui est pour nous, ainsi que l'avait observé Pascal (*Pensées*, Bruns. 386), marque de réalité. D'où vient cela ? De la volonté

qui s'y applique, et dont l'unité supérieure, qui domine tout ce processus, érige en une continuité véritable, qui s'identifie sans se répéter, une continuité uniforme, faite d'une série de discontinuités qui se répètent sans s'identifier. Le moi profond est seul continu, au sens fort du mot, parce que seul il est un : il est tout entier dans chacun de ses états, et la moindre portion de sa durée est comme un miroir de sa durée entière : telle une goutte d'eau suffit à refléter le firmament.

Or, ces données ou ces conclusions de la conscience présentent un extrême intérêt, car elles nous amènent à penser que *la continuité du temps vient du mouvement continu qui le remplit, et qui n'est lui-même que le déroulement indivisible d'une unité indivisible*, comme est le moi. Le mouvement de la flèche, observe M. Bergson, est aussi simple, aussi indécomposable, que la tension de l'arc qui la lance (*Evolution créatrice*, p. 334). Ainsi, à un plan inférieur, l'espèce, qui est la véritable individualité biologique, est une, et se manifeste par l'hérédité comme stable et comme continue dans le temps. A un plan plus élevé, la continuité de notre vie psychique n'est que l'expression de l'unité de notre moi. Mais cette unité, d'autre part, au plus haut degré de la vie individuelle qui est la vie morale, présente un certain rythme qui la distingue de tout ce qui n'est pas elle. Elle n'est pas homogène, comme l'espace et le temps physique : c'est seulement dans la mesure où nous sommes passifs, où nous ne sommes pas nous, que nous vivons dans cette continuité homogène, qui est le plus bas degré de la continuité. Par le fait que nous sommes des êtres pensants et voulants, nous introduisons dans l'unité de notre vie psychique des irrégularités, qui sont des noyaux de discontinuité : en ce sens, notre durée, faite de crises et de moments, notre durée, qui est une perpétuelle possibilité de crises nouvelles succédant au déroulement des crises anciennes, cette durée est essentiellement discontinue ; mais enfin cette discontinuité, qui n'est jamais une coupure, ne fait que nous

révéler à nous-même, dans toute leur richesse inépuisée, l'unité profonde de notre moi et l'indivisible continuité de notre vie intérieure.

8. Ainsi, les termes ou les individus, qui représentent les idées ou les formes aperçues par l'esprit, sont essentiellement pluriels et discontinus : mais chacun de ces termes ou de ces individus, appréhendé du dedans, comme le moi l'est par la conscience, nous apparaît comme essentiellement un et continu.

Cependant, par un étrange paradoxe, l'intelligence conceptuelle, soit simultanément, soit plutôt successivement, inverse tout et commet sur ce double point une double erreur. Elle met la continuité là où la nature nous présente des discontinuités, par exemple dans l'évolution : elle assimile l'homme au singe, comme elle assimile une œuvre d'art à son modèle mécanique, et le mystère chrétien aux mystères païens. Inversement, elle met la discontinuité là où la réalité nous apparaît continue ; ainsi, elle ne comprend la vie psychologique qu'en la résorbant en une poussière d'atomes mentaux reliés mécaniquement entre eux par des lois d'association. Quelle est la source commune de cette double erreur ? Il faut la chercher, croyons-nous, dans *l'inaptitude de l'intelligence conceptuelle à comprendre la qualité, qui échappe à ses prises, et à laquelle elle substitue naturellement la quantité*. Or, la quantité, continue ou discontinue, est quelque chose d'artificiel, et d'essentiellement relatif à un procédé de mesure, au choix arbitraire d'une unité : c'est un instrument commode, voire indispensable, dont il serait absurde de vouloir se priver ; mais il faut bien se garder de prendre pour une fin ce qui, en toute occasion, ne doit être qu'un moyen. Cependant l'intelligence verse constamment dans cette méprise. Pourquoi nie-t-elle les discontinuités dans l'évolution ? Parce qu'elles sont qualitatives. Pourquoi nie-t-elle le continu psychologique ? Parce qu'il est qualitatif. Et, précisément parce que ces réalités sont qualitatives, elle ne les voit pas. Elle substitue à la discontinuité réelle

des idées une discontinuité factice de concepts, et à la continuité rythmique de la vie ou de la pensée la continuité mécanique et homogène de la matière et de ses mouvements : c'est cela qu'elle dénomme le discontinu ou le continu ; et ces fausses notions lui masquent la continuité et la discontinuité vraies. Ainsi, par exemple, on a forgé la notion d'une *évolution* tout à la fois "continue," homogène, indéfinie, en ce sens qu'elle nie les discontinuités créatrices d'où procèdent et l'évolution elle-même et les types, et "discontinue," fragmentaire, limitée, en ce sens qu'elle résorbe le type en une série d'éléments qu'elle prétend expliquer à l'aide de petites variations accidentelles, extrinsèques, superposées les unes aux autres : et, cette notion tout artificielle, on l'a substituée à la notion seule féconde, seule réelle, de *développement*, qui implique pour chaque être un progrès centré, à partir d'un état initial ou d'un germe, objet d'une création, et d'ailleurs essentiellement un et identique dans son intime réalité. Le développement d'un être suppose donc, à son origine, une discontinuité radicale, ou une création ; mais, vu de ce point, il révèle une continuité fondamentale dans le mouvement qui le porte, à travers la durée, de l'état initial à son état final d'achèvement. Le développement, cette synthèse de l'un et du multiple, du discontinu et du continu, n'est que la finalité au travail : or la fin, qui fait l'unité de l'être et qui constitue pour lui la substance même du devenir, est posée par un acte créateur, qui fait la *discontinuité des êtres* et l'irréductibilité foncière des individus. Cependant cette discontinuité réelle n'est pas absolue : une certaine continuité règne entre ces êtres discontinus ; mais elle ne s'établit entre eux que si on les regarde d'en haut, dans la pensée qui les crée, dans l'unité supérieure où ils peuvent communier entre eux, chacun dans son ordre, sans cesser d'être eux-mêmes.

S'il en est ainsi, on comprend pourquoi la question de savoir si l'univers est continu ou s'il est discontinu est une question mal posée, une question qui n'a pas de sens et qui ne comporte pas de

réponse vraie, mais une question que l'intelligence ne cesse de poser sous cette forme, en raison de sa nature congénitale, qui la fait osciller sans arrêt d'une continuité abstraite à une discontinuité abstraite, sans la faire sortir jamais de la quantité. La seule question qu'il soit légitime de poser est celle-ci : Dans quelle mesure le monde est-il continu ? dans quelle mesure est-il discontinu ? Ce serait déjà un progrès énorme que de poser la question en ces termes : car, en philosophie, la position des problèmes importe plus que leur solution ; le sentiment des difficultés est plus fécond que la réponse aux difficultés ; il vaut mieux ouvrir les problèmes que les fermer. Et ce serait un progrès plus décisif encore que de dépasser l'antinomie basse du continu et du discontinu au sein de la quantité, pour s'élever à l'ordre supérieur de la qualité, où ces deux notions reparaissent sans doute, mais transfigurées, intimement unies, collaborant chacune dans son ordre à l'ordre de l'univers. La continuité que nous présente l'univers en sa totalité, et dans chacune de ses parties distinctes, individualisées, est la continuité d'un rythme, pareil au flux de la mer, qui compte, comme tout rythme, des accents, des points de discontinuité, mais en même temps une certaine allure générale, telle que ces points critiques ne se succèdent pas au hasard, mais qu'ils s'enchaînent et s'accordent selon une loi rationnelle, qu'on ne peut voir que d'en haut, parce qu'elle ne fait elle-même que traduire et perpétuer dans le temps un geste créateur, supérieur au temps comme il l'est à l'espace, et pourvoyeur, dans les choses, de diversité et d'unité, de discontinuité et de continuité, en un mot d'harmonie. •

VII

SEVENTH SESSION: *July 13th, 1924, at 8 p.m.*

Chairman: PROFESSOR J. A. SMITH.

SYMPOSIUM: THE IDEA OF A TRANSCENDENT DEITY: IS THE BELIEF IN A TRANSCENDENT GOD PHILOSOPHICALLY TENABLE?

By R. HANSON, HILDA D. OAKELEY, ALEXANDER MAIR, AND
CLEMENT C. J. WEBB.

I. *By* R. HANSON.

THE dominance of the concept of transcendent deity has been a persistent and characteristic feature of Western thought. For long ages the *onus probandi* has rested upon those who were concerned to deny its validity. They were few and their influence was transient. Nevertheless, a survey of the course of modern philosophy which attempted anything in the nature of generalization would be constrained to recognize an increasingly powerful tendency at work, amounting in the aggregate to a revolution, operating for the substitution of an immanent for a transcendent view. It is probable that we are approaching, if we have not already entered upon, an epoch when the burden of proof will rest no longer with those who deny but with those who maintain metaphysical or theological theories of which the primary note is transcendence. The traditional problem has been, given transcendence to establish so far as is possible and necessary some kind of immanence: the modern attitude inverts these

terms, given immanence to establish if it be possible and necessary some kind of transcendence. The object of this paper is to advocate the frank recognition of this change.

The persistence of the transcendent view of God may be attributed in the main to the supposed demands of the religion whose history has formed so large a part of the history of Western civilization. An uncritical amalgam of Hebrew mythology and highly abstract Greek metaphysics of the Platonic-Aristotelian type was employed as an instrument for the expression of the new values which primitive Christianity claimed to reveal. A quasi-metaphysical quasi-religious support to society was thus provided for the prolonged period of social and political disruption and reconstruction which extended from the third to the thirteenth century of our era. It is not surprising that a system which had rendered a service so vast and so obvious should have appeared as a permanent expression of the fundamental nature of things. Nevertheless, modern analysis claims to have resolved the synthesis into its constituent elements, and to have revealed the artificiality of the structure. The investigation into the origins of Christianity is by no means complete. Indeed, from the nature of the case, it can never be entirely completed. But it is already sufficiently clear to most candid inquirers, though not to all, that the imposing creed and organization of fourth century Catholicism, centering in the concept of the historic incarnation of transcendent deity, was the outcome of a syncretic process involving very diverse and even divergent elements. Such a process may or may not have been inevitable in the circumstances, but it can lay no claim to finality. The general recognition of this fact has already had and will increasingly have a profoundly disintegrating effect in competent theological circles. The very natural reluctance on the part of many earnest thinkers to compromise the values of Christianity has provided in the past a stronghold for traditional metaphysics. It has operated

almost exclusively in the interest of a thoroughgoing transcendence. For many minds, and their number is destined to increase, it operates in this way no longer. The investigation of origins has made it at least arguable that religion is primarily an immanent process of the spirit which in certain phases of experience seeks to guide its development by the ideal projection of its ends into a mythologically transcendent sphere, in order to reintegrate these values afresh in experience. It is becoming more and more doubtful whether this process involves any metaphysical demand for a purely transcendent reality. With increasing difficulty does the defender of metaphysical transcendence call upon God in his hour of need.

The disintegration of the traditional system began almost from the moment of its most perfect formulation at the hands of Aquinas. There are deep-seated reasons, social and political, which help to account for this, but the very form in which the scholastic thought was cast invited criticism. All the fissures in the traditional creed, the patchwork nature of the whole edifice, were relentlessly exposed to view by the unsurpassed candour in the face of difficulties by the profound subtlety in their solution, by the very triumph which attended the great constructive effort to reduce all to a coherent system. To undertake a completely reasonable account of a great cultural epoch, to represent it as a finished work, is in itself to invite criticism and to inaugurate change. Conservatives should not write *Summas*. The aloofness of Aquinas is indeed a portentous thing. He views the world like some highly privileged and wholly independent spectator: he sees it as an ordered hierarchy in perspective: it is a universe dualistic through and through with the dualism according to a strictly pre-ordained plan and interpreted throughout by means of the Aristotelian concepts of a pre-existing matter (for Aquinas it was, of course, not an uncreated matter) determined by the superposition of intelligent forms. In particular

the external nature of the dualism involved in the paramount distinctions between the Natural and Supernatural, the Realm of Nature and the Realm of Grace, God and creation, while in fact it only rendered explicit what had been implicit in the syncretism from the first, did at the same time both clearly reveal a position in which thought could not finally rest, and indicate a line of escape. We can trace in the history of modern philosophy the steps which led to the complete inversion of this position, until we reach in our own day concepts of reality in which the philosopher interprets the universe not from the external position as a privileged spectator but from within as an experient: in which the dualisms are not externally superimposed, but spring necessarily from the central concept. It is the history of the passage from a position where the basis of explanation is a logically demonstrated transcendence to a position where its basis of explanation is a directly experienced immanence.

It is possible to distinguish three main steps, which may be designated by the titles of Cartesian, Hegelian and Modern. It has been maintained that Aquinas himself provided the line of advance which led to the Cartesian position. His emphasis upon the relative independence of perception as a source of true knowledge and his clear-cut distinction between Nature and super-Nature, the former being susceptible of independent rational investigation, indicated at least the possibility of a genuinely scientific attitude of mind. But whether or not we can directly trace the birth of modern science to the teachings of Thomas, its vigorous youth can be seen in Cartesianism. The significance of the "*Cogito, ergo sum*" for all future philosophy, though very variously interpreted, has often been noted. It is clear that Descartes abandoned the position of the privileged spectator, and recognized that he was in fact a privileged experient, in immanent contact with reality. But in his haste to escape from the threatening gulf of solipsism he abandoned his

privileged position too soon and ended in a dualism as artificial as that of Aquinas. Nevertheless, though the Cartesian dualism of mind and extension is artificial it is far less purely external than the Scholastic dualism of matter and form. Descartes jointed the universe indeed, but he carved it as a dish fit for the gods, and the disjointed halves proved to be lively and fruitful. Mind and matter as he left them could each be investigated rationally, and were so investigated by succeeding philosophers up to the point where matter issued in the unconvincing mechanism of a d'Holbach, and mind was dissipated into sensational atomism by the scepticism of Hume.

The twofold *impasse* was overcome (so at least it is widely held) by the "*a priori* synthesis" of Kant. By bringing mind and extension, time and space together again at a deeper level of experience he inaugurated the next epoch on the path from a transcendent to an immanent view. It is, however, in the Hegelian development of Kant that the final passage is made from an externally conceived dualism to a dualism which is essentially internal, a dualism no longer physical but logical. But though the externality has passed away, a remnant of artificiality is still to be found. For Hegelianism is haunted by ghosts. After all, there is no man so incurably superstitious as your thorough-going rationalist, and it was the rationalism, itself a legacy of the concept of transcendent mind, which produced the artificial dualism. The argument crudely expressed runs thus: the universe is the expression of mind, mind is essentially rational, therefore the non-rational, which after all permeates experience must be transcended by the processes of an immanent logic. Or, again, the rational is the real, therefore the non-rational is in itself the unreal, the raw material of thought. Thus the ghost of transcendent deity and the ghost of Aristotelian matter walk the Hegelian world. In their death they have not been divided, for between them they have

produced the Absolute. It is only when the whole course of modern philosophy is kept steadily in view that the vast achievement of Hegelianism can be appreciated. Cartesianism weakened the hold of the transcendent God upon creation. In the most characteristic development of the Cartesian school the connexion which Scholasticism sought to represent as vital becomes increasingly artificial. God gave "une chiquenaude pour mettre le monde en mouvement : après cela, il n'a plus que faire de Dieu."* God provides the purely formal link between the two worlds of mind and extension. In a sense His transcendence is enhanced, but it is at the expense of His vitality ; at the same time the sort of immanence for which the Aristotelian system provides is completely discarded.

The whole subsequent development of Deism is inherent in these conceptions, and eighteenth-century thinkers readily demonstrated that a deistically conceived God is in fact superfluous. He may be, and He was, speedily reduced to a hypothetical and practically impotent First Cause. The Hegelian revolution by substituting the conception of logical ground for that of physical cause resolved this artificiality. In the Hegelian systems Deity ceases to be peripheral and becomes central once more. Transcendent mind dominates the universe as completely as in the system of Aquinas himself ; but the crucial step towards an immanent view of reality has been taken, for this transcendent mind is in no sense external. The conception is so far purged of anthropomorphism. The dominance of mind, to put the matter crudely, is not secured by the dictation of a policy to an externally created matter, its dominance is inherent, secured by the logical control of its own raw material. God is within the system. He no longer shapes it from without. Nevertheless, He still shapes it : the ghosts of

* Pascal, *Pensées*, 77. Edit. Léon Brunschvicg : Hachette.

form and matter haunt the stage ; and it must be affirmed that the anthromorphic metaphor of the potter and the clay does not cease to distort reality even though the potter be pure spirit and the clay raw sensation.

It is along these lines that the passage of the philosophic mind can be traced from the position of a privileged spectator to the position of a privileged experient, together with the parallel process involving the passage from an externally conceived and artificial dualism of matter and form to an internally apprehended and necessary dualism arising directly from immanent experience. The process marks the gradual evanescence of the concepts of matter and form, and it is claimed the consequent evanescence of the traditional concept of transcendent deity. The Cartesian dualism of mind and extension, itself an attenuation of the Aristotelian dualism of matter and form, is followed by a further attenuation into the Hegelian dualism of sense and thought. The criticism which attaches to the manifold systems which have been built upon these various premises is that they all alike present for our acceptance a universe which purports to be either a rational description or a logical structure, and in either case and *ipso facto* devoid of life. It would be ungenerous to say " they murder to dissect " ; it is both kinder and truer to remark that logic has been the last infirmity of many noble minds. It is doubtless a hard saying that thought must by its very nature be after-thought ; but it is none the less true. It follows that a dualism which is apprehended primarily by thought of necessity distorts the inherent dualism of a living process, for it is always at least one remove from the vital experience which it seeks to interpret. Absolute idealism with its logic of coherence no doubt distorts it least ; it distorts it far less than the syllogistic logic with its implication of a pre-arranged plan. For the adjustment which is inseparable from the manifestation of life certainly does suggest a kind of coherence far more clearly than

it suggests a kind of pre-arranged plan. But, even so, the most refined logic is in its nature static, whilst life is essentially dynamic, an ever-growing force involving a peculiar kind of transcendence which is developed from within, not in any sense a transcendence which exists independently and is imposed from without. The true dualism of which Scholastic, Cartesian and Hegelian dualisms are the more or less partial and inadequate expression is a dualism of immanent process. Its nature can only be grasped by an intuition which is prior to thought. The most significant feature in the recent and contemporary breakdown of absolutist systems is the clear emergence and the increasing elaboration of this fact.

To produce logical conviction is not the aim of this paper. On the contrary, it is an implication of the thesis that any such dependence on systematic logic results in a kind of simplification which falsifies the facts. The *a priori* and fundamental nature of immanent process cannot be demonstrated: it must be directly experienced and consciously affirmed at the outset. A cumulative argument, however, in favour of its acceptance as the most favourable starting point of all future metaphysic may be formulated from a consideration of the development of Western civilization as a whole. One aspect which might be indefinitely elaborated has been barely indicated. The appeal to other spheres of mental activity, to Art, Science, Literature, Politics, Criticism, would reveal the same complete revolution in thought, the same approach to an immanent standpoint. It is only possible in the scope of this paper to state the fact: and it is merely a further illustration of the fact, though a consideration of primary importance, that to assert in most well-informed circles and even to the merely intelligent outsider, the existence of an immanent life-force is in these days to call attention to the obvious. The thing is eminently verifiable in individual experience and in the whole spiritual and mental environment. On the other hand, a reference

to absolute mind or to transcendent deity awakens no common assent, invites interminable discussion and arouses extreme and widespread opposition. This is a point of very great practical importance. The joyous or at least the courageous affirmation of the obvious is, it must be said, the first necessity, though by no means the last necessity of any creed or philosophy which is to afford an adequate basis for civilization. Apologetics will never stop a rot. They merely call detailed attention to its existence. They beget a sense of weakness at the outset which entails a lack of virility to the end.

It is such lack of virility rather than any lack of logic which is the serious charge against the very able constructions of modern theistic thought. Whilst strenuously asserting the reality of both the transcendence and the immanence of God, theistic thinkers seem generally content merely to hint unutterable things about the how and the why. We look for philosophy or at least theology, and we seem in the end to be presented with a more or less subtle apologetic. Deism with all its limitations was a virile creed courageously affirming the *Weltanschauung* which it implied and boldly facing the consequences. Nineteenth-century theism, on the other hand, too readily appears as the death-bed repentance of a Deism purified indeed, but fatally damaged, in the fires of romanticism. It does not seem capable of developing an independent *Weltanschauung* from its own first principles, and it seems to be offering a perpetual apology for, and a grudging assent to, a *Weltanschauung* which exists in its despite and to its embarrassment. Is it altogether surprising that opponents are apt to argue unkindly from this obvious embarrassment to the inevitable transience of the phantom which experiences it? Jahveh has had a long and eventful history. But Jahveh as the belated and reluctant disciple of Jean Jacques is, it must surely be conceded in view of all the circumstances, a singularly unconvincing determination of the absolute. A theology which knows

its business will ever strive to produce the robust mental atmosphere in which it is possible to say with conviction, "The *fool* has said in his heart there is no God." Theology is approaching the final stages of decadence when it is constrained to admit with regret that the *wise* in rapidly-increasing numbers proclaim aloud their invincible ignorance.

The peculiar kind of transcendence which is inherent in immanent process has been described most fully in the writings of Bergson, but in large sections of modern thought the conception has already attained to the dignity of a commonplace. If the imagination and the understanding be allowed freely to absorb the modern *Weltanschauung* permeated as it now is in every direction by evolutionary concepts, more particularly and primarily if the attention be directed to the implications of our own conscious experience we discover as the most fundamental constitutive feature of all process a characteristic which may be expressed by the term self-transcendence. The expression is necessarily vague, but the fact, it is claimed, is fundamental and indubitable. It is the very condition of immanent process, of anything which we can call development or life that it exists by virtue of a duality. The upward push or trend of necessity implies a downward tendency over against which it expresses and develops itself. This fact cannot be logically demonstrated, it must be grasped by intuition: but when it is seized it is recognized as the most characteristic feature of reality as we experience it. This is the most primary form the true matrix of those other less fundamental dualisms of form and matter, of mind and extension, of thought and sense which modern philosophy has successively formulated and resolved. These less fundamental dualisms could only be resolved by the invocation of an independent principle, by the introduction of a more or less external or at least artificial transcendence. The dualism of an immanent life-force requires no such resolution for it is

wholly determined from within. Immanent process is necessarily self-transcendent.

It is the self-transcendent character of the process conceived in its purity which provides the concept of deity. An adequate account of the intuition of life cannot be given if the attention is confined to that dualism of an upward and a downward tendency in which it is necessarily expressed and primarily apprehended. We need to say not merely that here and now in this or that manifestation we apprehend a process which achieves a temporary expression through self-transcendence. In order to express the fullness of our intuition of life we are constrained to consider apart and to affirm distinctly the upward tendency of that dualism in which for us all life is expressed. We need to affirm this tendency as inherent and unconquerable. It is only through the isolation of this element that we can characterize the process as a whole. For the primary characteristic of that intuition whose fundamental nature we are seeking to affirm is not that of unending strife but that of unending life. The expression of life in time and space undoubtedly involves a dualism : that is our primary intuition. We may if we choose call this expression life : it is certainly life as we experience it in action. But then, if we adopt this terminology, we must go on to affirm a spirit of life which is inexhaustible and unconquerable. which, to use an anthropomorphic metaphor, however hampered or defeated in this or that manifestation, nevertheless pushes on to an ever fuller expression. This spirit of life is God.

Concentration upon the dualism of immanent process and failure to identify the upward tendency as a separable and distinct moment issues in the concept of emergent deity. This philosophy of emergent deity is a description, and so far as it goes a true description of the unresolved dualism which is characteristic of the outward expression of life. If it be only possible to describe the evolutionary process from without then the most that can be

said is that it displays a *nisus* towards deity. But, from the intolerable contradictions involved in the idea of a God who comes to be at the end of the process we may escape, if we will, by apprehending the process from within, by vigorously exercising our birthright as privileged experients. Viewed from within the dualism is no longer ultimate. It is apprehended indeed as necessary for the expression of life ; but it provides no exhaustive or even credible account of the nature life as such. If the conflict or increasing complication do in fact issue in the emergence of values and in the concept of deity it is the business of metaphysics at least to suggest a reasonable ground for this. The philosophy of emergence does not do so. It describes life, it does not characterize it. But while the business of science is to describe behaviour, it is the business of philosophy to investigate character, those permanent tendencies and traits which behaviour expresses but never exhausts. From an unresolved dualism, from mere complication nothing whatever can emerge. Dualism *qua* dualism can never issue in a process. Pure complication dwindles into mere repetition and ends in pure nothing : it is not life and cannot beget life : it is death. It is only when one term in the dualism, one element in the complication is recognized and affirmed as normative and constitutive that there can be any conception of process or development or continuity. The element which provides this ground for process and this character of continuity is the element of self-transcendence which can be as clearly recognized and is as completely present in the simplest dualism and in the crudest complexity capable of being apprehended at all, as it must be equally present and recognizable in the most advanced stages of cosmic evolution. It is the essential characteristic of life ; it is all there all the time, and it is by definition inexhaustible. In each and every expression of life it is one and indivisible. It is the divine element in the process and apart from it there could be no process at all. In those rare

creative moments when we consciously transcend our normal selves we hold veritable communion with God.

Nevertheless, the transcendence is determined as it is apprehended wholly from within. It is from first to last the self-transcendence of immanent process. There is no question of temporal or even logical priority. It is not a logical whole which we are conceiving, still less a predetermined development imposed or controlled by an *ens realissimum*. It is a living process which we are enabled to apprehend by a direct intuition, and in that intuition we can distinguish, amid and beyond the conflict in which life is expressed, an inseparable moment of analysed experience which is eternal and infinite and therefore divine.

Our destiny our being's heart and home
Is with infinitude and only there ;
With hope it is, hope that can never die,
Effort, and expectation, and desire,
And something ever more about to be.

II. *By* HILDA D. OAKELEY.

I FIND myself in one respect in partial agreement with Mr. Hanson, and I may perhaps, therefore, with advantage refer to this point before developing a position on the whole opposed to his. If I interpret rightly Mr. Hanson's standpoint, whilst maintaining primarily a doctrine of immanence, he recognizes the necessity of admitting a certain element of transcendence into that conception of the relation of the finite to the ultimate, which we are here attempting to interpret in the province of the philosophy of religion. To me, on the other hand, it seems impossible to make clear the truth of the belief in transcendence without demonstrating that it rests on partial immanence. Without the presence in the world in some degree of that mind which is the fundamental reality the principle of the transcendent would be a mere unknowable. As such it would appear to be of no value for religion, and of very dubious value for philosophy. Our point of agreement is then in regard to the recognition in the concept of deity, of elements both immanental and transcendental.

Whether the account given by Mr. Hanson of the emergence of a kind of transcendence, described near the beginning as meaning the ideal projection by the immanent spirit, "of its ends into a mythologically transcendent sphere," and later as a "self-transcendence which can be recognized as the divine element in the process of life," does actually afford a basis for the affirmation of the transcendent, I feel more doubtful. The source of my doubt lies chiefly in the method he employs in his argument. In reading his paper I was constantly reminded of Aristotle's dictum, "It is not possible to demonstrate in one science from the principles of another."

Certainly in the subject with which we are dealing no concept and no analogy can seem perfectly satisfactory. But in the selection of the concepts most likely to be illuminating ought we not to employ the test that they must lie within the sphere of that activity out of which the problem has sprung? Now the problem of the transcendence or immanence of the divine essentially springs from the activity of mind in its two forms, namely, first as practical or seeking good in some mode of relationship with other finite minds, secondly, as knowing and seeking truth. First as practical because we must recognize that the problem in the shape in which we are dealing with it is originally brought to philosophy by the experiences of the practical life. "Monism, whether of the more materialist or of the more spiritualist kind is . . . on the territory of history an incredible delusion, for it contradicts every unprejudiced impression of the actual working of life, and is directly refuted by that bit of history which each of us knows well, since each one of us lives it—our own personal experience." In these words of Ernst Troeltsch* the instinct of the wayfaring men is strongly expressed, and when we study the history of philosophy we see that in this they do not err. For no philosopher has succeeded in establishing an invulnerable monistic system without doing such violence to the facts represented by the practical experience as to stand himself upon a dualism which rends the philosophic life in twain. Here, perhaps, Mr. Hanson would agree, with a difference. For he finds "the ghost of transcendent deity and the ghost of Aristotelian matter" walking the Hegelian world. Nevertheless he thinks that "the crucial step toward an immanent view of reality" was taken by Hegel because the transcendent mind is no longer external. But when he finds it necessary to remove

* Quoted by Baron von Hügel in *Essays and Addresses on the Philosophy of Religion*.

Hegel's conception of God or Mind within the system as still significant of an artificial transcendence, and substitute the dualism of an "immanent life-force which as necessarily self-transcendent provides the concept of deity," does not the ghost of the Hegelian dialectic walk Mr. Hanson's world?

Certainly it is not altogether at home in these haunts. But I do not wish to press the point that we cannot avoid logical categories, even in maintaining an alogical position. In this respect all of us, except those who still hold that the too too solid world can be resolved into logical thought, must feel that their houses are partly of glass. What I wish rather to question is the plausible assumption so often taken as axiomatic by Bergsonianism that the whole procedure of thought is to translate into static lifeless forms the dynamic processes of life. Obviously to crystallize and arrest aspects of the ever-changing course of experience, making of them objects useful as a mosaic or for a cinematograph interpretation (valid within limits), is a mental method. Or in a more important sense, thought corrects the over-emphasis of the durational aspect of experience, reminding us how, in a moment, in the twinkling of an eye, it can be viewed, *sub quadam specie eternitatis*.

But this method of thought is not the whole of thought. To borrow a fine phrase of Gentile, thought "passes through the other," or object it creates, but it "passes through it without stopping." In its essence thought is creative, it "wanders through eternity," or creates eternity in its wanderings. It is everlastingly productive, in the invention of new concepts for the discovery of truth, in the origination of new ways of realizing good, in the urging of our vision to points of view from which fresh aspects of the world are revealed. The life process seems creative when we survey its endless productivity, it seems to strive for an end when we observe its invincible pursuit of a special form which in some lowly species overcomes all opposition. But

is it not here that we also find the most stupendous spectacle of repetition in stereotyped forms as of a blind force that cares for nothing but repetition even to infinite waste? It is for thought constrained by the infinity in its own nature that there is always uniqueness, even in the least differentiated particulars. It is thought which demands the discernibility of non-identicals. What value is there in the life process not introduced into it by mind? Even its creativity is a shadow of that of thought, its pursuit of ends a mockery of true teleology. The process *as a whole* suggests indifference though exhibiting innumerable features distinguishable as having value for mind. Descent belongs to it as well as ascent. The Aristotelian conception of the striving of all nature to God, revived in a qualified form, in Mr. Alexander's theory of the *nisus* of every order of the universe to the next stage of development, is a selective interpretation. Self-transcendence can only have the meaning that mind having awoken in life necessarily transcends life because it belongs to another order.

It is not, then, as I read experience, from a contemplation of the life process, or a characterization of it as "privileged experiences," that we can arrive at an interpretation of all that experience of existence as having value, which, as I should argue, proceeds from the nature of consciousness as finite-infinite. The diverse forms of value-experience are the modes of our consciousness of the whole human situation as the strain to that infinite, within which all experience is set. These expressions may seem lacking in precision, but I hope by illustration to make my meaning more definite. I shall attempt to show that the essential in our stage of experience is that it has this dual character of finite-infinite, and, therefore, it is that the individual is ceaselessly driven beyond himself in knowledge and practice alike. The animal is solipsist, egoist, finite. He possesses his soul in peace, he lives and dies in finitude. It is the awakening to infinity

that shatters the contented dream of life. This is the revolution through which the order of life passes into the order of mind. It is this which is the beginning of knowledge and of practice, the two directions in which the struggle to pass beyond finitude takes place. It may be shown that the method and success of logic, the unending extension of the universal, the "patience" of facts to this extension, does not belong to a closed world, the completed Absolute. The universal is the thread with which we seek our way to the flaming bounds of the world, or through the obscure infinitude of myriad forms of particular existence. The universal is in our own minds immanent, and we move with it to the edge of the transcendent. But though Kant said --Thus far and no farther-- we may ask: Is there not a Being in itself as well as for us? Yes, Reality is surely both. We can have no object of knowledge which is not known to us under the form of finite-infinite. As Professor Driesch observes, logic forces us beyond logic. Kant himself insists on the necessity which urges thought beyond experience, but he does not allow that its speculations in that beyond have validity for knowledge. He does not ask the significance of the fact that finite mind can never rest in finitude, and that its forms of thinking inevitably sweep beyond. And, again, to refer to Driesch and his view that the face of death opens the door to the higher metaphysics, the meaning in this saying is, I think, that we could not know that a whole universe of experience vanished with the point of view of the individual experient without knowing that the reality is beyond the solipsistic experience. A world cannot pass into nothingness if there remain no world for which it is nothing, And it may be added with this single step in the overcoming of solipsism we overcome all those limitations of epistemological idealism which may seem to support a solely immanent philosophy of mind. The universe, whilst fundamentally mind, is not only such as thought can comprehend.

A consideration of the form and character of our knowledge in the sphere of perceptive cognition should testify to the nature of that reality within which such experience is possible. There is a gradation in experience of which we become aware under the special conditions of the gradual awakening of consciousness to the world and revelation of the world to consciousness. Man may conceive himself to stand as it were at a middle stage in the order of experience as knowledge. The first of the animals capable of reflecting on the fact that with every additional sense a new aspect of the universe is apparent, he may ask (as Bergson and Driesch suggest) --Why is consciousness limited in me? Since as conscious being I know that mind is prior or that consciousness is the original relation, why is not all existence transparent to my thought? How is ignorance possible? The difficult lesson is learned through reflection on the fact that knowledge is developed through various organs or instruments, in the possession of which man may be infinitely restricted, as some creatures are more restricted than man. We may think from Aristotle's standpoint: "Necessarily if a single sense were lacking a whole science would disappear," or with Bergson we may conceive the organization of the brain as limiting knowledge. On either interpretation we are forced to the thought of illimitable powers of knowledge beyond our own, unconceived types of reality, worlds of value in the midst of which we may be standing, as it were, blind. Whether such extensions of experience are to be thought of from the point of view of the creative, or of the discovering activity of mind, is perhaps not so crucial a question as it appears to be at our intermediate stage of knowledge. Now the nature of the development, thus briefly referred to, suggests, or as I think, compels the postulate that there is no limit to the degree or kind of the transcendence of reality in relation to our consciousness of it. It is "Infinite in Attributes," of which we can only have knowledge of a very few. I do not

claim that the line of argument I have pursued represents any strict following of Spinoza. But I find in Spinoza's doctrine of the infinite attributes of substance the only metaphysical conception which offers an interpretation of an all-pervading character of our experience, a character in which possibly as a pre-Kantian thinker he was less interested. I must agree with the majority of students of Spinoza that he does not intend in his doctrine of infinite attributes to admit a dualistic principle into his system. Spinoza's Substance may even be, as Busolt* says, the "*ἐν καὶ πᾶν*" of ancient Ionic philosophy, though such identifications are always doubtful. He assumes, at least in general, that "logical predicates are identical with metaphysical." This would be the meaning of the *two attribute* doctrine. If we dwell, however, upon the antecedents of Spinoza's philosophy in mediæval thinking and Jewish traditions, and his place in Cartesianism, if, above all, we compare his immanent doctrine with those of post-Kantian monists, we shall better discern its implications. Such a consideration of the place of Spinoza's system in the history of thought cannot be undertaken here. It can only be urged that Spinoza's conception of Substance is charged with a meaning derived from that idea of God which is logical, in so far as logic requires it, in order to escape from the solipsism of mind as finite, but beyond all the logical relations yet discovered by thought, since they are all sought for and applicable within the order of experience as finite, though postulating the infinite. It is rightly so charged, if the point of view of this paper is valid, because in this way a place is found in Spinoza's doctrine for the recognition of the infinite beyond experience which must be expressed in the philosophical concept of God. On the other hand, the Spinozistic concept of substance has not been cabined and confined by the influence of the logical

* Quoted by Egon V. Petersdorff, *Chronicon Spinozanum II.*

movement from Kant to Hegel. In the Kantian phase of this movement it is presumed that the formal categories we employ set a final limit to the capacities of thought for knowledge, since they are bound to a special material of experience. In the Hegelian the assumption that logical thought is co-extensive with reality obscures the native recognition by thought of the transcendent element attendant on all experience, and stays the movement to realize this, though beyond the logical forms of order. With the doctrine of the Absolute resulting from this logical assumption we may compare the indications given by Spinoza of the reach of his little elaborated—philosophy of the Attributes: “You must observe,” he writes, “that I do not assert that I thoroughly know God, but that I understand some of His Attributes—not all, nor the greater part.” The ignorance of the majority does not prevent him from having knowledge of a few. But as is pointed out in Von Petersdorff’s article, “Spinoza places beyond doubt his view that it is impossible from the nature of the attributes known to us to conjecture the nature of the Infinite Attributes. His reasons (given in letter 64 to Tschirnhausen) are determined by his doctrine that “the mind’s power of understanding only extends to things which the idea of body contains in itself, or which follow therefrom,” that is to the knowledge of God in so far as he is regarded under the attribute of extension and in so far as he is regarded under the attribute of thought. “And from these two attributes or their modifications no other attribute of God can be inferred or conceived.” Tschirnhausen had asked whether there must not be as many worlds as there are attributes of God, since creatures constituted under some attribute unknown to us would have no idea of our world of extension even as we have no idea of their world. Spinoza, in reply, refers him to the passage in *Ethics* II, in which it is stated that substance thinking and substance extended are one and the same substance, comprehended now through one attribute, now

through the other. So evidently it would be in regard to the infinite attributes. There is then only one world, but (as Tschirnhausen rightly sees) this doctrine is difficult to reconcile with the doctrine that the human mind can have no conception of the nature of other attributes, coupled with Spinoza's view of the modes as expressed in infinite ways, namely, in all the attributes. For individual mind expressing a certain modification ought to perceive that modification as expressed through the other attributes. Spinoza's answer to this, that the Infinite Ideas of God have no connexion with one another, would not seem altogether consistent with a monistic system. The important point for the present purpose is that Spinoza appears to reject the suggestion that thought must be represented in all the attributes. We may interpret him in one sense as rejecting Hegelianism. On the other hand, his rejection of the universality of thought would carry him still further to the point of making impossible even the affirmation of the infinite attributes. It is in fact the interpretation of Tschirnhausen which is most illuminating in regard to the problem of immanence and transcendence. The view that thought must have some rights in all worlds must be accepted, not in the full Hegelian sense but in the sense that as thinkers we can know, and not merely guess, that there are more things in heaven and earth than are dreamed of in logical philosophy. Whether there can be a fuller knowledge than this of the Transcendent Being seems to be a problem for the individual, or for those powers or faculties of consciousness in respect to the exercise of which every individual consciousness is unique. And as regards the validity of such intuitions, it is not inconceivable that in some minds there should be manifested in relation to the problem of reality itself, that character of an intelligence which knows intuitively and not through the categories, which, as Kant says, may belong to God. Some also of Spinoza's expressions in regard to the intellectual love of God may be taken in the same sense.

e.g., "The mind in so far as it is eternal possesses the knowledge of God, which knowledge is necessarily adequate."

In brief, the view which I have indicated is opposed to Mr. Hanson's, in so far as he finds it doubtful whether the "immanent process of the spirit," which is religion, "involves any metaphysical demand for a purely transcendent reality," although I am not quite clear as to the import of the word "purely" in its context. For the transcendent reality seems to be a necessary presupposition of all experience distinctively human. The Spinozistic doctrine of infinite attributes appears, whether or not so intended, to provide that positive notion of infinity manifested in aspects, some known, some unknown to us, which is required for a theory of transcendence. The problems suggested by Spinoza's penetrating friend Tschirnhausen show how difficult it is in a metaphysical doctrine of substance to avoid the slide to purely logical idealism. Thought insists on being the Universal Attribute. Spinoza only avoids this because he starts from the conception of a reality which must in its very nature be infinite. On one side this doctrine, taken in earnest, may reveal alogical elements. From another point of view it is a necessary postulate of that world within which logic works. For Spinoza it was perhaps based on that fundamental intuition which he describes rather as the culminating point than the beginning of philosophy.



III. *By* ALEXANDER MAIR.

THERE are men of fastidious mind who would shrink a little from so formidable a question and would tend to meet the brusque and exacting challenge of it with a deprecating *peut-être*. It is a temper with which we cannot but have a lurking sympathy. It is hard and may even appear foolhardy and presumptuous to attempt to move here where there appears to be inadequate footing and where the air is so thin. But in the end we see that there is no evading the question, at least for those who follow the path of philosophy. The question is neither arbitrary nor accidental. It springs inevitably out of man's situation in the universe, his nature and needs, his hopes and fears. The individual thinker may be, and often is, arrogant enough, but philosophy is not arrogant. In formulating and confronting such a problem as this of transcendence, it is not making wild and impossible claims ; it is accepting, it may be with some misgivings as to its present resources, a necessary task. When the Platonic Socrates was approaching the discussion of a problem with close affinities to ours he is reported as saying to Adeimantus : " When little things are elaborated with an infinity of pains in order that they may appear in their full beauty and utmost clearness, how ridiculous that we should not think the highest truths worthy of attaining the highest accuracy." The spirit of this is right. When, however, we approach the " highest truths " or the highest objects of contemplation we may find that this accuracy is not so easy to come at. This, of course, is because the clean-cut predicates which emerge through analysis of objects in the realm of difference become more elusive as we advance in the realm of unity. And when we are dealing, as we are here, with a concept which manifests the highest degree of

integration, we must not be too hopeful of that definite specification which we associate with "accuracy," and if, perchance, we are asked for "a simple and straightforward answer" to any specific question that may be raised about it, we can only, with such patience as we can command, point out the unwisdom here of a specious simplicity and of misleading disjunctions.

There are indications that it has become unmodish, and therefore injudicious, to invoke the name of Hegel. He is *vieux jeu*. (If there be any recollection among the shades it is charitable to hope that the rugged champion of Reason remembers and still believes his own aphorism that no philosophy is ever refuted.) But even this discredited man may have occasionally said some things worthy of retention, and one of these, I think, is his doctrine of the defects of the *entweder-oder* attitude of mind in dealing with ultimate metaphysical questions. There is a danger that in the interests of what we take to be logical clarity we may fall short of the concrete truth. The issue which confronts us here is often raised in the form of: "Transcendence *or* Immanence" ? We are invited to make a choice as between these characters or predicates of the supreme reality. It is worth while, however, to ask whether this disjunction and implied opposition does not falsify the situation, put us in an artificial difficulty, and make any satisfactory answer impossible. The teaching of Logic itself is that reality is ultimately the subject of all predication whatsoever. There is nothing inherently grotesque in the statement, so far as it goes, that God is both immanent *and* transcendent any more than there is in the statement that He is both material and spiritual. If it be thought that this suggestion is but the device of an easy-going eclecticism, a pusillanimous Yes-and-No to a too-searching question, the imputation must for the present be borne. It is an alleviation in the meantime to know that both Mr. Hanson and Miss Oakeley by different methods of approach have arrived at the same conclusion. It is true that, as I read

him, Mr. Hanson, falling back as he does in the end upon intuition, takes the view that transcendence (and, for that matter of it, immanence) is not philosophically tenable or, at any rate, not philosophically justifiable, if by that is meant : based on a thought process of which an account may be given. But that may not be so much of a difference as it looks, for new intuition sometimes turns out to be old logic. And he conceives of transcendence in a way which is different from mine. But he does say immanence *and* transcendence. So, by the way, does modern theistic thought, which Mr. Hanson, alas, finds lacking in virility, but which I only find lacking in coherency. It is robust enough if not robustious, but it fails somewhat in its task of persuading the intellect.

Allof which leads to the too crude and obvious remark perhaps. in the present circumstances, that a good deal will depend upon the meaning we put upon the terms we are employing. It will clearly not do to pass on with the facile assumption that all men are at one as to what is intended by them. There is, for instance, it may be mentioned in passing, the seemingly transparent term "philosophically tenable." It might be supposed that those engaged in the business of philosophy were agreed about that. But are they ?

Perhaps I have done Mr. Hanson an injustice in supposing that he does not regard transcendence as philosophically tenable. He may consider intuition as a sufficient philosophical warrant for it. Others might hesitate, and some would refuse to do this. But we may limit our attention for the moment to the term "Transcendence." There is one sense in which this term has often been taken which, if it were adopted, would, it may be safely surmised, lead us rapidly to a conclusion and markedly abbreviate our deliberations. I am referring, of course, to that usage of "Transcendence" in which a merely external relation is indicated. It means not only separation but complete aloofness.

There is a total solution of continuity. The transcendent object is *above* and *beyond*, so immensely above and beyond as to be out of all contact with that which is transcended. God dwells in utter and ineffable seclusion outside His Universe, "seeing it go"—with, it might be imagined, a tolerant, perhaps ironic, and certainly quite detached eye. It would be too much to say summarily that this notion of a transcendent Deity cannot be philosophically justified. Manifestly, it depends upon the general philosophical theory in relation to which it is viewed, into which it is sought to absorb it and with which it has to be made coherent. And it would be merely naïve at this stage to say that, from the point of view of a *sound* philosophy, there is nothing to be said for it. It is true of all philosophical problems that they involve a whole systematic structure. Sooner or later, if we are persistent, we find that a *Weltanschauung* is in question. Here where we begin, not at the circumference but at the centre, this circumstance is immediately and acutely brought to our notice. And we must be content with noting it, since it is obviously impossible to approach the question in due form by setting out the said *Weltanschauung*. That note, however, will not be otiose if it keeps us alert to the general implication of the discussion.

With these reserves, however, it may be said that it does not seem necessary to linger on this extreme form of the transcendence idea. Among reflective men it is not now a "live" hypothesis. Under it, God becomes a mere formality. We bestow upon Him, as it were, the Chiltern Hundreds and He enters no more into our considerations. The scientific mind, if it takes any interest in the conception at all, is at the best politely tolerant. A *roi fainéant* of this description makes no sort of difference to it, save, of course—what it is inclined to assume in any case—that it is left with a quite straightforward and, in this regard, uncomplicated problem. The religious consciousness is by no

means indifferent, and is in revolt. An "absentee God" does not at all meet the religious need and demand. There is no assistance or nutriment for it in the idea of such. And, what is of most importance for us, to the philosopher who demands continuity and some kind of synthesis, it is otiose at the best. It is in the literal sense an impertinence. God exists, but He is not real, and presumably it is reality that philosophy seeks. It is generally said in connexion with the deistic presentation of this conception of transcendence that it was the outcome of an attempt to rationalize religion. Strange things have been done in the name of reason; few, one is fain to think, stranger than this.

Profoundly influenced as it has been by Christian doctrines and teaching, the mind of Western civilization, not always with clear or even dim awareness, is imbued with a view of Deity far other than that just glanced at, but in which, none the less, the transcendent element is present and is important: though, at the same time, it seems to me to be an overstatement to say, as Mr. Hanson does, that this teaching has "operated almost exclusively in the interests of a thoroughgoing transcendence." Such characteristic doctrines as those of the fatherhood of God and of divine love do not look like insistence upon a "thoroughgoing transcendence." They would, on the contrary, appear to indicate a desire to bridge the void which seemed to yawn between the sons of men and the Deity. God is no more a *nominis umbra*, but a living power touching closely the mundane process and human concerns. He is the Ruler, Preserver, Friend. The god of Mr. Wells is not the Christian God, but when he speaks of him as the Great Companion, he is expressing what is, so far forth, an important and continually recurring Christian idea. There is no bare externality here. There is an intimacy and inwardness in the relation between the Deity and His creatures which removes us definitely from such bare externality or pure transcendence. There is now the possibility, and, it is strongly

maintained, the actuality, of intercourse, communion, call and answer. The phrase "Closer than hands or feet" is more than a poetical flourish, it is the authentic expression of a Christian conviction. It may or may not be mistaken, but it is *there*. It is extremely difficult—if it be at all possible—especially when many centuries of human experience are involved, to trace out the actions and reactions of self-conscious deliberate theorizing on the one hand and simple, uncritical conviction on the other. This, it might be said in passing, should put the thinker on his guard when he is invited to accept "facts" and acknowledge "intuitions." *Per contra*, philosophers tend to exaggerate the role of the intellect in the affairs of mankind—except in those recurrent phases of disgust and discouragement when they may become somewhat violent in their announcements of the ineptitude of the intellect. The former weakness is a respectable weakness; but even those who are subject to it will allow that the attitude we have been considering came into being and maintained itself—will, one suspects, continue for some time to sturdily maintain itself—not so much as the response to the demand for intellectual satisfaction, but in a less articulate but equally persistent call of the human spirit which sometimes finds itself lonely and weak. The attitude has often enough been theorized. And there is nothing seriously disturbing in the objection that such theorization is *ex post facto* and no more than conceptual embroidery. Fortunately for us, ideas which have no explicit rational ground often take possession of us. They are not to be summarily rejected on that account. It is just our business to find out if they are rationally justifiable or not. There may be good reasons, though as yet we do not know them. And this is precisely what we have to find out in the present case. To do this we must, *pace* Mr. Hanson, go further than a reference to the general drift of opinion or belief which, even if we accept it as established, cannot be more than a datum for us.

The conception or, if the term be preferred, the attitude to which we have been referring is social in its character and is based on the relation of person to person. In it the third of the familiar triad of metaphysical objects is somewhat overlooked. Experience is regarded as an adventure of the soul: the world, the milieu in which it is enacted, is lightly regarded. It is but a transitory thing and of relatively slight significance. There is here no continuing city. The physical cosmos is little more than a painted scroll to be rolled up presently. The really vital objects are God and the Self, and the one all-important topic that of the relation of these. There is more than a suspicion of pure transcendency here in the way in which God's relation to the world and the world's relation to God is thought of. In the manner of thinking of that more vital question, the relation of the Self to God, transcendent features also appear. We find, all through, a steady insistence (both from an ethical and a psychological standpoint), upon the intrinsic worth and the independent status of the human person. Just as in human intercourse, even in the deepest and closest communion, there remains an impermeable core of personality in each of the participants; we may be *at* one but we never become one; self-identity is never lost; so, in our relation to the Deity, God is infinitely greater, but He remains an Other. To abandon this view, it is held, would be to render meaningless many of our experiences and make illusory the moral life in which man's nature finds its deepest and most precious expression. This emphasis upon the uniqueness, dignity and worth of personality means impatience with all attempts to show that All is One, a dislike of all suggestions of the possibility of complete unification in the mystical ecstasy, or, again, of the philosophical idea of being ultimately absorbed in the Absolute. Always communion, never union. If this is difficult to theorize, and a surd appears just where it is most awkward and distressing to the

theoretic intelligence, it is unfortunate, but there is nothing to be done. We must cling with tenacity to the highest we know. Pantheism, lower or higher, has its troubles also, it is pointed out, and it will be found that these have their tap-root in what is held to be the impossibility of showing that so unique a "fact" as the Self can be merely a characteristic of something else no matter how great and venerable, an adjective merely and not a substantive, in the terms of a memorable discussion still fresh in our recollection. "My consciousness is distinctively my own," as a representative statement* runs, "and it is inconceivable how it should continue to be what it is for me and at the same time to be an element in a larger consciousness." The statement is made on psychological grounds, but with an eye to ethical considerations. This view does not apparently commit its holders to a view like that of Professor Howison, namely, that of a great self, a central entity round which are grouped innumerable minor selves, though that would seem to be the fitting conception. But it may be that the feature of transcendence appears here too nakedly. And, though it looks a little like running with the hare and hunting with the hounds, the effort is made to maintain that, while the finite self must retain its integrity and God must remain an Other, yet He must somehow be thought of as the ground and the continuous support of these finite selves. Nevertheless, the transcendent feature is unmistakably there.

This seems to be a concession to religious demands rather than the admission of a logical necessity. There is force in Mr. Hanson's phrase about "the very natural reluctance on the part of many earnest thinkers to compromise the values of Christianity." But it is not so clear that this has provided a "stronghold for Metaphysics," though it may have furnished a sanctuary for some metaphysicians. Metaphysics maintains itself by keeping alive

* Galloway, *Philosophy of Religion*, p. 476.

the thought of the possibility of an intelligible synthesis. It stands for and strives towards unity. Critics may properly insist upon the difficulties and defects of monistic systems, and in much more convincing ways than that expressed in the forcible but unimpressive words of Troeltsch quoted by Miss Oakeley. It is but just that protest should be made against a too summary and hasty closing of the philosophical account. But an ostensible synthesis can only be criticized effectively in the interests of a completer monism. Otherwise philosophy shrivels into the form of a "descriptive science" and so fails of its end.

The concept God is taken here to be the expression of the philosophic ideal. Spinoza's proposition, "Quicquid est in Deo est" states philosophy's unfailing demand. It is the philosopher's compass, though not his map. The champions of transcendence, in the sense in which we have been considering it, have both the right and the duty to point to obstacles in the way and to bring to our notice such apparently recalcitrant "facts" as that of human personality and all that is concomitant therewith in the moral experience of mankind with its implication of "freedom" and self-determination, the inward conviction of uniqueness and the like. They are on quite sure ground in insisting that we shall not evade these or trample roughshod over them in the fervour of our desire to reach our goal. If it be urged, however, not only that we must not evade those obstacles but that they cannot be surmounted, and that philosophy in face of this final mystery must compromise, philosophy, in the patient pursuance of its appointed task, will for ever refuse to assent. There is no rest for it in an *impasse* of this sort. It is foolishness, of course, to minimize the problem of difference, and to pass over it the sponge of a high-sounding universalistic formula. But it is equally unwise to exalt difference into something absolute and to be overawed by it. For while its spectacular value is unquestioned and it furnishes entertainment for those

whose delight is to passively contemplate the panorama of existence, it has in itself little meaning—indeed, no meaning, if taken absolutely. Difference demands unity in order that it may be known as difference. Only by being overcome does it come to be what it is for us. And, in so far as we explicitly seek to overcome differences and turn our thoughts and aspirations towards a universe, we are progressively conscious of this underlying or, I would prefer to say, suffusing unity which lives and manifests itself in all the members. Lotze, writing of things, says*: “Not only is the nature of things so adapted that they can supplement one another, so as to become the causes of results, but also the fact of their correspondence must be understood by reference to a continuous and substantial unity of all. This correspondence is not a lucky hit which alone has been realized among many equally possible but actually unrealized cases of non-adaptation of beings independent of one another and perfect self-dependence as regards their content—but it depends upon this, that all which exists is but one Infinite Being which stamps upon individual things in fitting form its own ever-similar and self-identical nature.” So far this expresses what is intended by me. It is Spinoza’s “*Quicquid est . . .*” — with a difference. And, to come to the kernel of the present matter, can we not suggest that what is said *à propos* of things may also be said of persons? Man, in the phrase which Professor Pringle-Pattison has made current, is “organic to the world.” He is also (and therefore) “organic to God.” There is immanence here. In the life of man there beats the pulse of the Eternal Life. It is manifestly impossible to find in our finite experience quite specific and satisfactory ways of rendering this, and to speak of a human being as a cell in the divine body or a personality as a “pulse of the eternal mind” is to use what are but dim adumbrations. But, if taken for what they are, they

* *Microcosmos*, Eng. trans., II. 600. 601.

may serve. Man belongs to the universe and to the ground of the universe, and that in no merely external way. Else one can but think of him, if one be interested at all in his *meaning*, as a troubled and transient phantom—words without a speaker—coming from nowhere, going nowhere.

It may be merely temperamental and so unworthy of a philosopher, but I find it difficult to appreciate the force of the contentions, earnestly and eloquently advanced by thinkers who are entitled to the most careful hearing, that such a pressing of the immanent view at this point as against the transcendental impinges upon and impairs man's worth and status. It is said, as has already been pointed out, that such a view as is put forward here takes all the substance out of many of the highest human values and renders them illusory. Is this the case, or is it not rather true that human life as I have suggested becomes trivial and transitory without such a conception as is so much deplored by the advocates of transcendence in this particular form? Theirs is a form of abstract separations which seems to do less than justice either to God or man. It goes to strange lengths on occasion when men who would disclaim any suggestion that we can tamper with even the precession of the equinoxes will, in the interests of human independence, assert that we can frustrate the will of God. A melancholy kind of "dignity."

We are familiar enough with the repeated protests made against what is called the "abstract individual," who appears in certain political and social theories. The protests are justified. My collaborators write of ghosts. Here is a veritable ghost. It is a commonplace to us that it is in and through participation in the life of that greater entity—I had almost said greater person—that the "individual" takes, as it were, solid shape, acquires personality, significance and dignity. It is by *participating* in that richer and fuller life, in being the agent and the functionary of a more enduring, far-reaching purpose than his individual

"will to live" that he acquires merit and worth. If that be so at this level of integration it would seem *a fortiori* to be also the case at that higher level at which we must place ourselves in contemplating man as the citizen of the universe, a functionary (or, better, a function) of God. This ought to be dignity enough and status enough for the most exacting.

Before departing from all this and since "values" are in question, it may not be entirely irrelevant to enter a modest plea on behalf of the value of intelligibility, a value which should not be without interest and importance to those who pursue philosophy. We sometimes tend, intimidated a little perhaps by suggestions such as Mr. Hanson makes as to the "superstitious" character of the full-blown rationalist, to wilt at the mention of "value" and to retire upon a not too coherent neo-empiricism where the especial philosophic value has less than its rights.

But, returning to the main point, the insistence upon the important aspect of immanence does not make it impossible at the same time to contend for the feature of transcendence also. Not in the deistic nor in the ordinary theistic sense, but in the sense of an excelling or surpassing. This, indeed, appears to come out of the considerations already advanced. For while it is contended that the *ens realissimum* appears and manifests itself and must appear and manifest itself at every point of reality, it is not asserted that the manifestation is equally full in each case, nor that it is complete in the fullest revelation of the real yet made to man. The closing note of the discussion in the *Republic*, of which we gave at an earlier point the opening note, expresses well, *mutatis mutandis*, the point which it is desired to emphasize here. Though it is familiar enough, we may set it down once more: "We must say that to what is known, not only its being known is imparted by the Good, but also its being and existence, *though the Good itself is far beyond existence in dignity and power.*"*

* *Republic*, 509, Bosanquet's translation.

If "knowledge of God" were to imply our knowing the ground of all objects whatsoever as an object among objects, an existent "out there" over against other existents, then we should have to agree with Kant in his denial of the claim that God can be known. It may be that He is not even an object to Himself, but simply "enjoys" Himself, and at this vanishing or culminating point the warrant of realism ceases to run. But though we cannot achieve the impossible, because absurd, it does not seem necessary to conclude that we are condemned to an invincible ignorance. As we come to know a man through his words and deeds we may, we must on the presumption of immanence, apprehend Deity in the measure in which we comprehend the universe. And yet here our approach cannot be other than asymptotic.

Were the universe completely luminous to us, pierced through and through to its remotest recesses by the light of science, we should still know that there was a beyond and that God cannot be equated with His "works." And we recognize that we still are some distance on the better side of such a possibility as has been named. Man, the first of creatures, on this planet at least, in whom the all-pervasive life becomes self-conscious, knows but too well the narrow limits of his illumination. It is to this that Anatole France is giving perhaps picturesque expression when he throws out the remark that we may hope to have a science of biology in about a million years. The light of our intelligence illuminates but a narrow patch in a vast expanse of dark and tumbling seas. This very sense of limitation, however, is significant. It suggests to us Bosanquet's not unreasonable characterization of man as a finite-infinite creature. In his striving after the extension of knowledge he exhibits a *nostalgie de l'infini*, which infinite indeed is in him but far surpasses him.

Miss Oakeley's use and application of Spinoza's idea of

infinite attributes is helpful and instructive in this connexion -- if we do not press it too literally. The scheme of substance and attributes is perhaps too rigid for a situation like this, leading us to think of beams from a central light or, less worthily, of spokes radiating from a hub and with no relation save the quasi-formal relation of being concentric. But the main point is there and in a vivid if not an adequate shape. The notion of infinite manifestations themselves of varying grades of fullness, as the life of a man—it is our poor best in the way of analogy—may be expressed in a rough blow or in the genial wielding of the sculptor's chisel, in an inarticulate cry or in an epic. "Life-force" is possible, but it seems to leave something to be desired, perhaps it is the crude implications of the term "force." The "life" of which it is here written is one that thinks and loves and understands; it is no mere blind striving.

It is doubtful if this manner of contending for transcendence is likely to bring any kind of satisfaction to, or command any assent from, many religious believers or doctors, and so far as it is a defence of belief in transcendence they may regard it as a "gift of the Greeks." This is hardly relevant since our business is with philosophic tenability and not with any other kind of edification. At the same time, it may be said that the conception does not appear to me to be at all foreign or antagonistic to a religious attitude. What is more relevant is the possible objection that it is strange doctrine to emanate from a monistic quarter. This, I think, is only so if we think of the advance of knowledge in the linear way and not as the expansion and elucidation of a developing unity. The fear that if it were taken in earnest the conception would weaken and indeed immobilize the impulse towards knowledge has no substantial ground. It is a conception that is indeed witnessed to by the life of knowledge and is at least to those who are content with the wages of going on—which means to all good philosophers—an incitement and an inspiration.

IV. By CLEMENT C. J. WEBB.

THE question which is propounded for our discussion in this Symposium may be understood in two ways: in one of which I should reply to it in the negative, while in the other I should give an affirmative answer.

Professor Wildon Carr has frequently, and especially in his recent work called *A Theory of Monads*, called attention to the important part played in the philosophy of the seventeenth century by the notion of a transcendent God, in relation to which Descartes and Leibniz, to name no others, discussed such philosophical problems as those of mind and matter, substance and individuality, which do not (or at least need not) arise out of a specifically religious experience, but are suggested rather by the scientific investigation of natural phenomena. Professor Carr has insisted that, while at bottom these fathers of modern speculation were engaged upon the same region of inquiry as interests those who, like himself, are now concerned with the philosophical interpretation of the "principle of relativity" which has been brought forward in our own day as an inference from certain observations and experiments of astronomers and physicists, yet the phraseology which they employed, and which assumed the existence of a transcendent Deity, has become for us obsolete. "In modern philosophy," as he puts it,* "the idea of God is part of the general problem of individuality. In the seventeenth century the theological concept of God was the beginning and central point of speculation. This," he continues, "was due to the strong human interest aroused by the religious reformation of the sixteenth century." At any rate, the word *God*, as employed by the philosophers of the seventeenth century, suggested

* *A Theory of Monads*, p. 117.

to their first readers and to most of themselves ideas which had their roots in religious experience, although they made use of it in dealing with inquiries in regard to which it is possible and indeed desirable to abstract from religious experience altogether. Anyone who compares the statement of the so-called ontological argument by Descartes with the statement of it by Anselm in the eleventh century will feel that, even although we may consider that the upshot of Anselm's reasonings was only to establish the legitimacy of the philosophical conception of an "Absolute," yet to Anselm himself, truly philosophical as his thinking is, his religious experience is its starting point and suffuses it throughout: while Descartes, though we need not deny that Christianity and even Roman Catholicism were, as Professor Jacques Chevalier in his recent book upon him has urged, matters to him of genuine and intimate personal conviction, is yet primarily interested in the theory of knowledge, and it is his concern with the problems of the physicist and the psychologist, not, as with Anselm, the quest of salvation and of reconciliation with God, that inspires him in his speculation. It is no doubt true that one great thinker of the same period, Spinoza, deliberately laid aside the tradition of a transcendent God, while not disusing the word which suggested it to his contemporaries. But that, in so doing, he was departing from the common usage of his time is shown by the fact that he was regarded as an "atheist," notwithstanding his appropriation of the old language to his own "immanent" Deity; while he was probably enabled the more readily to detach that language from its old associations that he had, on the one hand (as Mr. Leon Roth's learned monograph* has lately pointed out) different theological antecedents from those of his Gentile contemporaries, and, on the other hand, a natural capacity for religious emotion greater than that of either Descartes or Leibniz, and therefore less strictly bound up than theirs with traditional assumptions.

* *Spinoza, Descartes and Maimonides*, Oxford, 1924.

A change, which Mr. Hanson in his paper not unjustly describes as a revolution, has since the seventeenth century passed over the mood of European speculation, in consequence of which the conception of God, so far as it enters into general philosophy, has become the conception not of a transcendent Creator, but of an immanent unity. To give a full account of this change would be to write the history of modern philosophy. It is sufficient here to observe that two movements of thought have mainly contributed to bring it about. One is the movement in philosophy itself toward a fuller realization that the ultimate unity, in the search for which philosophy has always been engaged, and to which the name of *God* was traditionally given, must not, if it is to meet the demand for the satisfaction whereof it was invoked, leave the manifold which it is introduced to unify, outside of itself. The other is the advance of biological science, which has made the hypothesis of an external designer of the "adaptation" of means to ends observed in organisms at once less necessary to account for certain facts and more difficult to reconcile with others, while almost inevitably suggesting to the investigator the thought that results such as seem at first sight to postulate conscious purpose may be actually attained by some kind of immanent "urge," *élan vital*, or the like, without any consciousness of an end being present to an individual mind at all.

When the conception of evolution is taken seriously by philosophy, the tendency in the latter to what we may call "immanentism" is greatly reinforced. By Herbert Spencer evolution was still on the whole regarded as a process in which nothing genuinely *new* is produced, and his own cosmology was ultimately cyclical, like that of the ancient thinkers of India and of Greece. The old theistic argument that a world in which mind and will have appeared postulates mind and will in its Author can be urged against him, because he does not affirm that (as we may perhaps put it) the stream of existence can rise higher than its source. It

cannot be as well pressed upon a thinker like Bergson, with his *creative* evolution, or like Croce, who explicitly rejects theism on the ground that it reduces the historical process to an idle reproduction of what is already perfectly realized from eternity in God. For such the Aristotelian principle that *ἐνέργεια* must ultimately be prior to *δύναμις* does not hold; and there is thus no common ground between them and those who rely upon arguments for theism which, like Aristotle's own, presuppose this principle.

If, then, the question before us be understood as asking whether the belief in a transcendent God can be maintained as a philosophical tenet entering into our general account of the material universe and of its relation to the mind that apprehends it, I should reply that it can no longer play this part as it did in the systems of Descartes and of Leibniz. In that sense I should answer our question in the negative.

But it is otherwise if the question be otherwise interpreted. Philosophy after all must take *all* our experience into account, and religious experience does seem to me to imply what we may call the transcendence of God. But then the God of religious experience is not merely what Pascal calls the *dieu des philosophes et des servants*; although this latter would probably never have been called by the name of God at all had not Philosophy entered from the first into a field already occupied by Religion, which was beforehand with it in giving expression to man's natural aspiration after a solution of the ultimate problems suggested by experience to our reason. If by "philosophically tenable" we mean not merely tenable as a principle to be utilized in dealing with questions of general philosophy, into which the consideration of the demands of religious experience need not enter but "tenable *as true* and not only as a figure of speech"—then I should answer our question in the affirmative, because I consider that otherwise our religious experience is inexplicable. There does not seem to be anything inadmissible in the view that our

religious experience should reveal to us something about the ultimate reality which is not otherwise revealed to us. In fact the recognition that it does so is involved in the acknowledgment of its right to be regarded as an independent or autonomous form of experience or spiritual activity at all.

It is thus noticeable that Croce, who, as we have already observed, very deliberately and decisively pronounces the transcendence of God philosophically untenable, connects his position with a no less deliberate and decisive refusal to regard religion as an independent or autonomous form of our spiritual life. And apparently Professor Carr would do the like. "The God in whom we trust," he says,* "is an idol of our imagination." Regarding the so-called ontological argument as opposed in its direction to the other two traditional proofs of God's existence,† he prefers it to them, as expressing the intuition of a unity of body and mind, thought and action, function and structure, "which is the basis of the necessity of thought which posits the idea of God, the idea of a higher unity, the infinite individual whose essence involves existence."‡ To this idea of God, while considering it as alone possessing philosophical value, he explicitly denies any power to satisfy the aspirations of religion in the ordinary sense of that word. And, if he does not say so as plainly as Croce, he at least leaves the impression that this is not because in religious experience there are disclosed features of reality from which abstraction is made in the speculations which he is discussing, but rather because, as he says,§ "the philosophical conception of God lies on a higher plane" than that on which "ordinary religious experience moves."

The revolt of Pascal, the most religious among the great scientific men of the seventeenth century, from the *dieu des philosophes et des savants* to the "God of Abraham, of Isaac, and

* *A Theory of Monads*, p. 100.

† *Ibid.*, p. 119.

‡ *Ibid.*, p. 118.

§ *Ibid.*, p. 100.

of Jacob," and the detestation of a very different man of genius in the next age, the poet Blake, the originality and profundity of whose religious experience is as remarkable as the strangeness and waywardness of its expression, for "this Natural Religion--this impossible absurdity"* alike bear witness to the fact, to which I wish to call attention, that the "rational theology," so roughly handled by Kant, was vitiated by the use in it of the divine name apart from a definite reference to the religious experience which alone gives to that name a meaning that cannot be better expressed by a term less suggestive of "transcendence."

At the opposite pole to the "immanentism" (if I may so call it) of which I have been speaking, stands a school of thought which, until the other day, when his lamented death deprived the philosophical fraternity in this country of one of its most distinguished and most beloved members, had a powerful champion in the late Dean Rashdall. Theologians of this school are inclined to dismiss, as merely figuratively significant of a close conformity of human will and judgment to the divine, such familiar religious language as speaks of ourselves dwelling in God and God in us. Such language seems to them impossible otherwise to reconcile with the attribution of genuine personality either to God or to man. Against this contention I have often found myself maintaining that it overlooks essential features of religious experience which make it impossible to regard God as just another person (however superior in power, wisdom and goodness) side by side (so to say) with oneself. But the contrary doctrine, which, while appealing to the witness borne by mysticism to the immanence of God in finite spirits, treats on the other hand as merely figurative the religious language in which the soul's sense of a personal relation to God is expressed, lies, as it seems to me, open to an analogous criticism. Apart from religious experience the necessity of this language can no more be perceived than can that of the

* *Milton*, 42.13.

language of mystical piety. But both are necessary for the expression of that experience. Both are no doubt in a certain sense figurative or metaphorical; but only in a sense which is compatible with being the only language wherein the experience described by it could be expressed; not in the sense that it would be possible to describe it more plainly and simply (and therefore better) in some less figurative phraseology.

I think that there is a real analogy to this situation in the revelation by our social intercourse with one another at once of an independence and of a capacity for fellowship which, if abstraction be made from the experience of such intercourse, it must appear difficult to reconcile on the one side with the unity of reality—emphasized by what is sometimes called “monistic” philosophy—and, on the other, with the independence of individual personality emphasized by what we may, with Professor Carr, describe as “monadic” philosophy. I call this an analogy, because I should accept almost all that Professor Alexander says in his admirable discrimination of religious from social experience in *Space, Time and Deity*.* They are not the same, but there is nothing so like the one as the other; and both, as I should say, reveal about their respective objects something that, apart from them, must remain unperceived.

Theology then is the science of religious experience and not the last chapter of a non-religious metaphysic; and the problem of the nature of the ultimate unity or of the supreme individuality should only be stated as the problem of the nature of God, when religious experience is explicitly taken into account. It was the error of the “rational theology” of the seventeenth and eighteenth centuries that it tended to assume as a factor in a non-religious problem a conception that derived all its significance from an experience which was nevertheless regarded by it rather as a consequence of that conception than as its source.

* ii, pp. 380, 381.



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